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RAPPORT ADMINISTRATIF

(1947)

REPORT

of

ADMINISTRATION FOR THE YEAR ENDING OCTOBER 31st 1948

I. General.

Composition of the International Council for the Exploration of the Sea.

At the last Meeting of the International Council, in October 1947, Professor Martin Knudsen resigned the Vice-Presidency and Mr. G. J. Lienesch, Holland, was elected in his stead.

With the passing of Professor Sir D'Arcy Wentworth Thompson, who had worked within the Council ever since the constituting Meeting in Stockholm in 1899 the Council has suffered the loss of one of its outstanding members. Until his death Sir D'Arcy was Chairman of the Statistical Committee, and only two years ago retired as Editor for Statistics.

For the present Meeting the following countries have appointed new Delegates: Belgium: Dr. Paul van Oye, Denmark: Dr. Å. Vedel Tåning instead of Professor Martin Knudsen, Eire: Mr. Denis O'Driscoll, Norway: Professor H. U. Sverdrup instead of Mr. Sellæg; from Sweden, Professor Hans Pettersson will again attend in place of Professor N. O. Zeilon.

Composition of the Bureau.

The Bureau consists of: Professor Dr. Johan Hjort, President, Mr. A. T. A. Dobson, 1st Vice-President, Dr. K. A. Andersson, M. Pierre Tissier and Mr. G. J. Lienesch, Vice-Presidents. Mr. Henry G. Maurice is Président d'Honneur with the right to attend the Bureau Meetings. At the last Meeting of the Council it was decided that the Chairman of the Consultative Committee should attend all Meetings of the Bureau.

Committees.

A list of Committees will be found in pt. I, pp. 28—30.

Meetings.

Meetings of the Bureau took place in October 1947 and May 1948, at Copenhagen. These meetings were attended by all Members of the Bureau, except M. Pierre Tissier for whom Dr. J. le Gall deputised. The General Secretary and the Chairman of the Consultative Committee also attended.

A further meeting for planning international oceanographical co-operation took place in Göteborg from December 7th to 11th as recommended by the Council at its last sitting in October 1947. Present were: Professor Braarud, Dr. Eggvin, fil. cand. Greger (Sweden), Dr. Stina Gripenberg (Finland; then in Göteborg), Lt. Cmdr. J. R. Lumby, Dr. A. R. Molander, Dr. Nils Rosén, Dr. John B. Tait, Mr. Helge Thomsen and Professor N. O. Zeilon. The final report from this meeting was distributed to the members of the Sub-Committee and other interested persons on April 7th. It is reproduced here as Appendix 1 on p. 9. According to the programme laid down in this report investigations were carried out in May and at the end of September this year by Denmark, England, Norway, Scotland and Sweden.

The meeting of experts studying clupeoid fishes (except herring) recommended by the Atlantic Slope Committee and voted by the Council took place from April 26th to 30th 1948 in Biarritz. Present were: representatives from Belgium, Denmark, France, Great Britain, Holland, Norway, Portugal, Spain, and Sweden, also the President, Professor Dr. Johan Hjort, and the General Secretary Dr. H. Blegvad. The report of the meeting is given as Appendix 2 (pp. 11—21) and the proceedings will be published in a separate volume of the series Rapp. et Proc.-Verb.

Professor le Gall represented the Council at the "Congrès International de Zoologie" in Paris in July 1948.

According to the decision of the Council, the Chairmen of the Hydrographical Committee and of the Plankton Committee, Messrs. Helge Thomsen and F. S. Russell took part in the congress of the "International Union for Geodesy and Geophysics" in Oslo in August 1948. Mr. F. S. Russell has delivered to the central office a report on Oceanographical Observations from Atlantic Weather Ships (App. 3 A), and this has been distributed to the members of the Plankton Committee and to the members of the Sub-Committee for Organization of Combined Hydrographical-Biological Investigations; Mr. Helge Thomsen has given a short report of the proceedings of the

meeting (see App. 3 B). According to the decision of the Bureau at its meeting in May also the General Secretary, Dr. H. BLEGVAD, took part in the said meeting in Oslo.

The meeting of the International Union has requested the "International Mixed Commission for Oceanography" to ask the International Council for the Exploration of the Sea to appoint a scientist to represent the Council in the Mixed Commission. This question will be laid before the Council.

Statement of Accounts.

In accordance with the decision to fix the budget at the beginning of the financial year, the Bureau has considered it necessary to alter the financial year so that this begins just after the Council Meeting. As future Council Meetings will take place during the first half of October the financial year will thus run from November 1st to October 31st. The Bureau has accordingly decided to prolong the present financial year. This decision means that it will in future be impossible to lay the actual and audited Statement of Accounts before the Council at its annual meeting. A provisional Statement of Accounts and a provisional Balance Sheet was, therefore, worked out and presented in typescript at the annual Meeting in October 1948 together with an explanation of the difference between the Estimates and the provisional Statement of Accounts for the prolonged financial year.

The final Statement of Accounts and Balance Sheet are presented overleaf and give rise to the following remarks.

Expenditure.

Instead of a year of 12 months the Statement includes $15^1/_3$ months (i. e. $^{22}/_7$ 1947 to $^{31}/_{10}$ 1948) in respect of expenditure. As to Income the extra $3^1/_3$ months have not been taken into account, Taking the items of Expenditure point by point the excess in the case of I, Incidentals is simply the addition of "Incidentals" for $3^1/_3$ months. Under items II and III (Headquarter Staff and Hydrographical Staff) most of the excess is due to similar additions; furthermore small alterations in cost-of-living bonus have carried with them minor adjustments of salaries. Under IV, Office Expenses, the excess of about 11,800 Kr. over Estimates is also due to the prolonged financial year, which *inter alia* has caused the Rent, Light and Heating and Expenses in connexion with the Council Meeting to appear twice in one financial year. When the preliminary Statement of Accounts was given this excess was estimated at about 10,000 Kr. only, but later a claim for payment of Kr. 1,125.— in war-insurance in respect of the last half of 1945 was received and paid, and something more has been used for Stationery and Miscellaneous than estimated at the end of September.

Item V, Travelling Expenses: This amounts to 27,206.90 Kr. but it must be remembered that the expenses of the representatives of the Council attending the meeting of the International Union for Geodesy and Geophysics as well as certain subsistence expenses for a prolonged stay for special purposes for some of those attending the Council Meeting would normally not have appeared in the financial year 1947/48 in which case the "Travelling Expenses" would have amounted to 22,000 Kr. as estimated.

Item VI, Printing and Distribution. Besides the 50,000 Kr. estimated, a sum of 3,500 Kr. was put aside for printing expenses under "Extraordinary Expenditure" and in view of the fact that about 20,000 Kr. on the Estimates for the financial year 1946/47 did not come to payment in the said year, the sum of about 70,000 Kr. does not seem unreasonable. A specification of publications issued and paid is attached, in addition a sum has been added for publications in preparation.

Item VII, Pension Fund. The rather high figure here is due to the fact that premiums covering the two years $^{22}/_7$ 1947—$^{21}/_7$ 1948 and $^{22}/_7$ 1948—$^{21}/_7$ 1949 were paid during the present financial year. The 5 % of the salaries repaid by the three members of the staff for whom a pension scheme has been arranged have been deducted from the total premiums up to October 31st 1948 only. The pension scheme began as from July 22nd 1947 and in the preliminary Statement of Accounts the personal contributions towards pension premiums were deducted up to July 21st 1949 and these contributions carried to "Debtors". For practical reasons, and at the suggestion of the Auditor, the Bureau, however, decided not to deduce premiums up to $^{31}/_{10}$, in view of the fact that the present financial year is an abnormal one and that in future the *correct* figure for the Council's contribution to these three pensions would automatically appear in the Statement of Accounts, without any need for carrying part of the personal contributions over "Debtors". Before the pension scheme was adopted by the Council in October 1947 the usual first rate (Kr. 1,750.—) was, in accordance with the standing resolution on September 1st transferred to the Pension Fund Account. It was agreed by the Bureau to leave this amount on the Special Pension Fund Account, the interests of which will hardly cover the pension to the former Statistical Secretary.

Item VIII, Extraordinary Expenditure. According to Estimates provision was here made for 1,500.— for Assistance with the Hydrographical Card Index to which has been added the equivalent amount for the extra $3^1/_3$ months. The above-mentioned 3,500 Kr. for Printing Expenses has not been used. After the final Meeting of the Council in October 1947 it was decided to draw "Incidentals" of Kr. 1,000.— on this item for the new Chairman of the Hydrographical Committee, as it had been overlooked that the former Chairman was paid in his capacity of Hydrographical Consultant, and, therefore, did not receive any honorarium as Chairman. One more expense has, however, been added since the preliminary Statement of Accounts was issued, viz., an extraordinary cost-

Income and Expenditure Account for the period $^{22}/_{7}$ 1947—$^{31}/_{10}$ 1948.

EXPENDITURE

	D. kr.	D. kr.
I. Incidentals		
1. President	7,500.00	
2. Vice-President	3,833.33	
3. Editor of the Journal	5,111.11	
4. Assistance to Editor of the Journal	2,555.55	
5. Chairman of Consultative Committee	5,111.11	
6. Chairman and Vice-Chairman of Committees	28,111.07	
7. Editor for Statistics	2,555.55	
8. Editor of Plankton Sheets	1,277.77	
		56,055.49
II. Headquarter Staff		
1. General Secretary	11,716.53	
2. Biological Assistant	4,047.03	
3. Assistant Secretary	11,716.53	
4. Editorial Secretary	10,414.70	
5. Statistical Secretary up to $^{1}/_{12}$ 1947	2,935.35	
6. Clerical Assistant up to $^{1}/_{12}$ 1947 / Statistical Secretary as from $^{1}/_{12}$ 1947	8,816.54	
7. Clerical Assistant	8,087.40	
8. Clerical Assistance	6,066.77	
		63,800.85
III. Hydrographical Staff		
1. Hydrographical Consultant	3,930.01	
2. Hydrographer	14,151.19	
3. Assistance	1,896.00	
4. Clerical Assistance	6,246.15	
		26,223.35
IV. Offices Expenses		
1. Rent	11,160.00	
2. Light and Heating	2,099.85	
3. Stationery, books, etc.	3,746.37	
4. Telephone, telegrams etc.	2,176.62	
5. Insurance	1,577.31	
6. Upkeep, cleaning etc.	3,688.87	
7. Miscellaneous	5,309.52	
		29,758.54
V. Travelling Expenses		27,206.90
VI. Printing and Distribution		
1. Printing	65,340.51	
2. Drawings, translations etc.	2,931.35	
3. Distribution	1,601.29	
		69,873.15
VII. Pension Fund		11,277.73
VIII. Extraordinary Expenditure		
Chairman of Hydrographical Committee	1,027.77	
Work with Hydrographical Card Index	1,916.00	
		2,943.77
Extraordinary cost-of-living bonus to staff from $^{1}/_{1}$ 48—$^{31}/_{10}$ 48		2,233.40
		289,373.18

RECEIPTS

	D. kr.	D. kr.
I. Contributions		
France	20,000.00	
Great Britain	20,000.00	
Belgium	10,000.00	
Denmark	10,000.00	
Eire	10,000.00	
Finland	5,000.00	
Holland	10,000.00	
Iceland	10,000.00	
Norway	10,000.00	
Poland	10,000.00	
Portugal Balance	6,689.27	
Spain	9,990.00	
Sweden	10,000.00	
		141,679.27
II. Interests		
On Bank Deposits	935.95	
On Investments	5,796.82	
		6,732.77
III. Sale of Publications		3,665.32
Excess of Expenditure over Income		137,295.82
		289,373.18

Pension-Fund.

EXPENDITURE	D. kr.	RECEIPTS	D. kr.
Pension paid	4,371.40	Balance as per July 22nd 1947	108,373.46
Balance as per October 31st 1948	110,467.48	Transfer from revenue	1,750.00
		Interests	4,715.42
	114,838.88		114,838.88

Balance Sheet October 31st 1948.

LIABILITIES	D. kr.	D. kr.	ASSETS	D. kr.	D. kr.
Capital Reserve:			Cash at Handelsbanken	11,278.48	
Balance as per July 22nd 1947	257,784.72		Cash at Sparekassen	5,096.62	
Less Excess of Expenditure over Income	137,295.82		Cash at Postgiro	80.59	
		120,488.90	Cash in hand	282.09	
					16,737.78
Pension Fund		110,467.48	Danish Treasury Bonds as per Oct. 31st 1948 nominal value 140,000.00 at cost		138,030.99
Sundry Creditors		44,279.87	(Market value on Oct. 31st 1948: Kr. 132,731.00)		
			Pension Fund:		
			Cash at bankers	1,775.07	
			Danish Treasury Bonds as pr. $^{31}/_{10}$ 1948 nominal value 111,000.00 at cost	108,692.41	
			(Market value on Oct. 31st 1948: Kr. 105,122.25)		110,467.48
			Debtors as per Oct. 31st 1948 Contribution for 1946—47		10,000.00
		275,236.25			275,236.25

We have scrutinized the foregoing Accounts and Balance Sheet and are satisfied that it is correct.

(sign.) Å. V. Tåning H. Blegvad

K. A. Andersson

I have compared the above Balance Sheet with the Books and Vouchers of the council, and certify that it is in accordance therewith. I have verified the existence of the cash on hand and at bankers as well as of the Treasury Bonds.

Copenhagen, February 1st 1949.

(sign.) Karl Sørensen,
State-Certified Auditor.

of-living bonus to the staff, voted by the Bureau by correspondence. The Bureau at its meeting in May 1947 decided that the salaries of the staff should be made comparable to positions under the Danish Government and that salaries should, in future, rise and fall with the cost-of-living index in the same way as the salaries of Danish Government employees. The Danish Government, however, in November 1948 decided to pay an extraordinary cost-of-living bonus to all officials for *two* years as from January 1st 1948 in view of the fact that they had been underpaid during the war. By correspondence the Bureau decided to follow the Danish Government in this and to draw the amount for the 10 months from the accounts for 1947/48 which were not yet closed at the time the Danish Government's law was voted.

Income.

In the preliminary Statement of Accounts the interest on Treasury Bonds was calculated up to October 31st 1948 and the sum carried to Debtors. As in the case of pension premiums, the Bureau decided not to carry these interests to Debtors as the total amount of interests for a complete year in

Report regarding Cost of Publications issued during the period 1945—1948.

During the two previous financial years specifications of the cost of publications could not be given, the release of the publications having been delayed by a printers' strike. Analogous with the administrative reports for the years 1942/43, 1943/44 and 1944/45 a full list of publications issued in the three financial years since July 1945 is given below:—

Series	Month	Year	Volume	Pages	Subject		Cost
							D. kr.
A	March	1946	CXVI	104	Report of Annual Meeting 1945 and Administr. Report		4,733.89
-	August	1947	CXVII	92	— - — — 1946 - — —		4,115.35
-	—	—	CXVIII	40	Special Scientific Meetings 1946		1,785.60
-	April	1948	CXIX	132	Salmon in the Baltic (by Prof. JÄRVI)		7,908.50
-	May	—	CXX	130	Report of Faxa Bay Committee		9,484.36
-	—	—	CXXI	96	Report of Annual Meeting 1947 and Adm. Report		4,986.00
-	Novbr.	—	CXXII	62	Special Scientific Meeting 1947	ca.	4,318.07
C, 1	July	1947	XV, 1	118	Journal du Conseil	5,850.70	
-	April	1948	XV, 2	132	— - —	6,343.17	
-	Sept.	—	XV, 3	118	— - —	5,734.99	
							17,928.86
D	Decbr.	1947	XXIX	80	Bulletin Statistique for 1939		5,031.25
F	Febr.	—	II	174	Annales Biologiques 1942—1945		13,628.32
-	March	1948	III	116	— — 1946		8,670.38
G	Decbr.	—		24	6 Plankton Sheets		1,247.31
					Miscellaneous		520.88
					Sundry Creditors for publications in press		9,836.63
					Total Printing in 3 financial years ...		94,195.40[1])
					Translations etc. 1945—1946	667.79	
					1946—1947	1,198.45	
					1947—1948	2,931.35	
							4,797.59
					Distribution 1945—1946	165.53	
					1946—1947	118.36	
					1947—1948	1,601.29	
							1,885.18
					Total ...		100,878.17

	Estimates	Total Expenses	
1945—1946	25,000.00	5,567.21	
1946—1947	45,000.00	25,437.81	
1947—1948	50,000.00	69,873.15	(the financial year prolonged to $15^1/_3$ months)
	120,000.00	100,878.17	

[1]) It must be noticed that no Bulletin Hydrographique has been issued during these three years. The last issue, in 1944, covered the years 1938 and 1939 and its cost was about 13,000.

future automatically will appear in the Statements of Accounts. Thus the total amount in respect of interests Kr. 6,732.77 does not give a true picture of interests falling due in the prolonged financial year. Two countries have already paid certain amounts for the financial year 1948/49, viz., Finland, 1st payment, Kr. 2,500.— and Sweden an increased contribution of Kr. 15,000.—. These Kr. 17,500 have been carried to Debtors.

Balance Sheet.

Comparing this year's Balance Sheet with that of the preceding year it will be noticed that the reserve has been decreased to Kr. 120,488.90 as against Kr. 257,784.72 last year.

The Pension Fund has increased from Kr. 108,373.46 to Kr. 110,467.48 partly from interests and partly from the above-mentioned transfer of 1st payment of the former standing contribution which is to be replaced in future by the contribution to the Pension Company for payment towards pensions to the three members of the staff falling under the pension scheme.

The contribution from Belgium for 1948/47 is, due to a misunderstanding, still outstanding.

II. Work at the Central Office in Copenhagen.

No changes in the staff and their work have taken place, but Professor KNUDSEN wished to retire as Hydrographical Consultant as from October 31st 1948.

Publications and Library.

Work has been carried out according to routine along the customary lines; printing continues unfortunately to proceed very slowly. All printing firms are short of hands, overtime work is not done and there are still arrears of work from last year's long strike that have not yet been cleared off. Each phase in our work takes consequently a very long time.

The exchange of publications with Germany is being resumed; some publications have been received and the latest issues of the Council's series have been distributed according to a revised list of German addresses.

The following publications have been released during the year in question or are in preparation:

Rapports et Procès-Verbaux, Vol. No. 119: Prof. JÄRVI's Salmon Report, issued in April, distributed in June together with Vol. 121; Vol. 120: Faxa Bay Report, printed in Stockholm, issued in May and distributed in June directly from Sweden; Vol. 121: Procès-Verbal 1947 and Administrative Report 1946, issued in May; Vol. 122: Scientific Meeting 1947. Corrections of one paper are still outstanding; Vol. 123: PAUL M. HANSEN on Greenland Cod. The galley-proofs have been received; Vol. 124: Administrative Report 1947. Proof prints of the reports from the Chairmen will be distributed at the Council Meeting.

Annales Biologiques, Vol. III, 1946, was issued in March; Vol. IV, 1947: proof prints will be ready for the Council Meeting.

Journal du Conseil, Vol. XV, 2 was issued in April, and 3 in September; Vol. XVI, 1: Some material has been received and sent to the printers.

Plankton Sheets. The first six sheets have been printed and copies will be laid before the Plankton Committee at their next meeting. Further manuscripts have been received from Mr. G. P. FARRAN: 11 sheets on Calanoida, of which 7 are ready in first proof—and 10 sheets on Mysidacea from M. H. NOUVEL.

Statistical Department.

All the material expected for the Bulletin Statistique 1940—44 is now to hand, and the manuscript is being prepared for the printer.

For the next Bulletin Statistique we have received material for 1945 from Belgium, England, Denmark, Faroe Islands, France, Eire, Portugal, Scotland and Sweden, for 1946, from Denmark, England, France, Eire, Portugal, Scotland, and for 1947 from Holland and Portugal.

Hydrographical Department.

The work has been carried out under the supervision of the Hydrographical Consultant to the Council, Professor MARTIN KNUDSEN.

Bulletin Hydrographique. As recommended in 1946, the next issue of the Bulletin will comprise the years 1940—1946, with appendices for the years 1936—1939. The data for the years 1936—1944 have been sent to the printers, but all data for 1945 and 1946 have not yet been received.

The preparation of a 1947-issue of the Bulletin has also been commenced. Hitherto few observations only have been received for that year.

Photostat sheets have been prepared of part of the data received and copies have been delivered at request.

Hydrographical Card Index. The data received for printing in the Bulletin Hydrographique have been recorded on index cards. In addition to this the card index has been augmented with many observations, especially from Atlantic waters, extracted from various publications.

The calculation of monthly anomalies of the surface temperature in areas of the northern part of the North Atlantic has been continued. Computations for some areas and stations round Iceland have now been completed.

On the basis of data contained in the Hydrographical Card Index, monthly anomalies of the surface temperature in areas of the northern North Sea have been completed.

The results are being published in Vol. IV of the Ann. Biol.

Papers published during the Year:

JENS SMED: Hydrographic Conditions in the Faroe-Shetland Channel in August 1946. Annales Biologiques, Vol. III, pp. 10—12. (1948).

— Monthly Anomalies of the Surface Temperature in some Areas of the North-Western North Atlantic in 1876—1939 and 1945—1946. Ibid., Vol. III, pp. 12—23. (1948).

— Hydrographic Conditions at the Northern Entrance to the North Sea in August 1946. Ibid., Vol. III, pp. 40—41. (1948).

H. BLEGVAD.

APPENDIX 1.

Report from the Meeting of the Sub-Committee for Organization of Combined Hydrographical-Biological Investigations

held in Göteborg December 7th—10th, 1947.

1) Present:
Prof. T. Braarud, Norway,
Dr. J. Eggvin, Norway,
fil. cand. Greger, Sweden,
Dr. S. Gripenberg, Sweden,
Lt.-Cdr. J. R. Lumby, England,
Dr. A. R. Molander, Sweden,
Dr. N. Rosén, Sweden,
Dr. J. B. Tait, Scotland,
Mr. H. Thomsen, Denmark
Prof. N. O. Zeilon, Sweden.

2) The object of the meeting was:

(a) to discuss the preliminary results of the co-operative investigations in the North Sea and the Skagerak carried out during May 1947 by Denmark, Norway, and Sweden, and

(b) to consider: plans for a combined survey of the North Sea in 1948; the final working up of the data collected on the cruises in 1947 and the working up of material from cruises planned for 1948.

3) Surveys in 1947. From the investigations in 1947 charts and sections of temperature, salinity and density were shown by Dr. Eggvin. It was pointed out, *inter alia*, how and where the cold bottom water in the Skagerak and the Norwegian Channel had been formed, and some interesting features of the current conditions in the area considered were demonstrated.

In 1948. It was recognized that the purpose of these surveys was twofold, namely:

(a) to provide information on current hydrographic events in the North Sea. For this purpose new observations were essential,

(b) to provide data for the study of the relationship between the variations in inshore waters and those in offshore waters. The establishment of such a relationship would facilitate the object outlined in paragraph 3 a, by economizing the number of observations required. Existing material might give information on this question.

4) As regards the surveys in 1948, it was considered that surveys were desirable at the time when sea-temperature was near its extreme values. The earliest practicable period for the first survey was found to be the first half of May. For the second survey, the second half of September was most convenient, though fewer ships would be available then than in May. The programme for the September survey was drawn up tentatively only; the final arrangement would be co-ordinated by Dr. Eggvin at a later date.

5) The location of the sections and stations was considered in detail; from experience gained on the 1947 cruises, certain alterations seemed desirable, and the larger number of ships co-operating permitted extension of the survey so as to include the Faroe-Shetland Channel, the south-eastern part of the Norwegian Sea, the Skagerak, and the southern half of the North Sea.

(a) The sections decided upon are shown in the accompanying chart (Fig. 1), and a list of stations is annexed.

(b) For May, the sections were allocated as follows:
Sections A, B, C, G: Scotland
— D, E, F, H, N: Norway
— J, K, Q, L, M, P: Sweden
— R, S: Denmark
— T, U: England

Sweden would undertake two anchor stations, one on section F, the other on section H. The data from these stations would be comparable with those from permanent stations on the Norwegian coast.

(c) For September, the provisional allocations were as follows:
Sections F, H, J, Q: divided between Scotland and Norway
— K, L: Norway
— M, P: Sweden
— R, S (western halves): England
— T, U: England

(d) All sections except P, M, and N should be run during the week 3rd—11th May 1948. The dates for P, M, and N would be arranged later.

6) (a) Salinity and temperature observations would be made at all stations, the following depths being taken as standard:

0, 10, 20, 30, 50, 75, 100, 125, 150, 200, 250, 300, 400, 500 m., and bottom where that is deeper than 500 m., or intermediate to the standard depths.

(b) Oxygen and phosphate observations were considered desirable. The selection of stations at which these would be made was left to individual countries; it was suggested that these observations were especially desirable at nanoplankton stations.

(c) Nannoplankton samples should be obtained at stations midway along sections C, D, E, F, M, and U on the May cruise. Professor Braarud would arrange the details with the institutions concerned.

7) It was considered that useful information on conditions prevailing over the rest of the year could be obtained from two sources, namely:

(a) surface observations from ships other than research ships:

(b) casual research ships observations.

As regards (a), it was appreciated that while surface observations from such ships were not sufficient to record conditions in deeper areas, they were likely

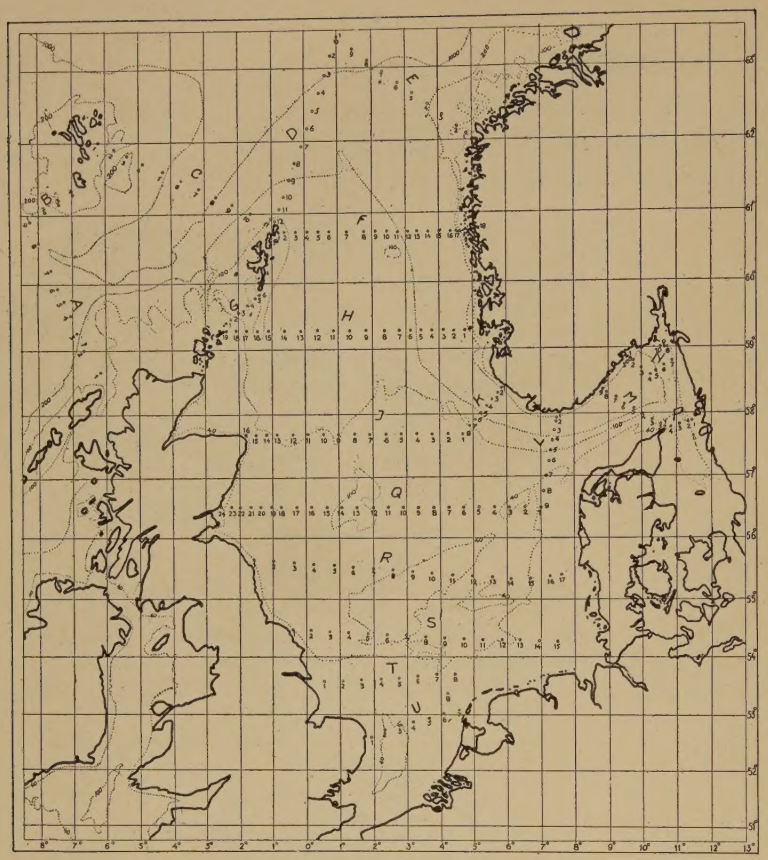

Figure 1. Location of the Sections.

List of Positions for the Research in the North Sea and Adjacent Waters.

Section	Area	No. of Stations
A	Butt of Lewis—Faroe Bank	9
B	Faroe Bank—Syderø, Faroe	4
C	Svinø, Faroe—Shetland	11
D	63°20′ N., 01°00′ E.—North Unst.	12
E	63°20′ N., 01°00′ E.,—Kråkeness	10
F	Balta Sound—Feie	18
G	Danis Hd—Sumburgh	6
H	Utsira—Start Point	19
J	57°41.7′ N., 04°43.0′ E.—Kinnairds Hd	16
K	Egerøy—57°41.7′ N., 04°43.0′ E.	8
L	56°30.0′ N.. 07°00.0′ E.—Ryvingen Fyr	9
M	Skagens Rev—Torungen Fyr	9
N	Jomfruland Fyr—Ursholm Fyr	10
P	Paternoster Fyr—Skagens Rev	4
Q	56°30.0′ N., 07°00.0′ E.—Buddon Ness	24
R	Longstone—Vyl	17
S	Whitby—Helgoland	15
T	Humber—Terschelling	8
U	Gross Sande—Texel	8

to be more frequently and regularly obtained than those from research ships; at present there were no means of extending these observations to sub-surface levels. Mr. THOMSEN reported that the question of a suitable network was already being examined by the Service Hydrographique.

As regards (b), it was suggested that whenever opportunity offered for hydrographical observations to be made in the region covered by the survey, the section or stations chosen should conform, as far as possible, to those selected by the Committee for the survey.

8) It was appreciated that other biological observations might be desired in addition to those decided upon at the meeting. It was accordingly suggested that this report, together with the chart, be circulated to the interested parties.

Enquiries for additional biological work could be made directly to the institutions responsible for running the particular section, or sections on which it was desired the work should be done, as follows:

Scottish sections: Scottish Home Department, Aberdeen.

Norwegian sections: Fiskeridirektoratets Havforskningsinstitut, Bergen.

Swedish sections: Oceanografiska Institutet, Göteborg.

Danish sections: Marine Biological Laboratory, Charlottenlund Slot, Charlottenlund.

English sections: Fisheries Laboratory, Lowestoft.

9) The Working up of the data.

As regards the 1947 data, the committee considered that the first step was the presentation of the broad results of the surveys. To ensure the maximum value to biologists, these results should be published as quickly as possible. It was decided that the most useful form for presentation would be charts—on Mercator projection—of salinity and temperature distribution for the level of 0, 20, 50, 75 m., and the bottom, for each of the two periods (involving the preparation of 20 charts). The charts should be accompanied by such sections as were found necessary to illustrate the different features, and by a short descriptive text.

Dr. EGGVIN would undertake the preparation of the charts, sections, and text, and it was suggested that reproduction could best be done from the Council's offices in Copenhagen.

10) It was considered that the same procedure might be followed for the 1948 surveys. Publication

might be hastened if the preparation of the charts were shared by the different countries. Dr. Eggvin would arrange this. By this means, the broad results of the May 1948 survey should be ready for presentation at the meeting of the Council in October.

11) The study of the data in connection with the problem outlined in paragraph 3 b) could not be considered at the present stage. It was considered that this question would not be ready for discussion until after the 1948 surveys had been completed and the broad results examined. At this later stage the question of the hydrodynamical treatment of the data could also be examined.

Addendum re para 8.

It is realized, that if several biologists approach the 5 institutions mentioned in para 8 it might lead to confusion. It is therefore recommended, that biologists, who wish to make proposals regarding biological investigations other than collection of nannoplankton samples in connection with the hydrographical scheme, should as soon as possible communicate with Dr. Vedel Täning, Marinbiologisk Laboratorium, Charlottenlund Slot, Denmark, who will try to coordinate such wishes and make the necessary arrangements with the five institutions.

Jens Eggvin.

APPENDIX 2.

Réunion des Experts du Conseil International pour l'Exploratton de la Mer à Biarritz, 20–26 Avril 1948.

BIOLOGIE DES CLUPÉIDÉS (LE HARENG EXCEPTÉ)

Introduction.

Le Conseil International pour l'Exploration de la Mer, réuni à Copenhague à l'occasion de la 35ème Assemblée Plénière, ayant approuvé, lors de sa séance du 27 Octobre 1947, la recommandation présentée par le Comité Consultatif: que les travaux poursuivis sur la biologie de la sardine et des autres clupéidés (le hareng excepté) fassent l'objet d'une réunion d'experts du Conseil qui discuteraient les méthodes d'investigations et les résultats déjà obtenus, cette réunion, dite "Conférence de la Sardine", s'est tenue, sur l'invitation de la France, du 20 au 26 Avril 1948, dans la ville de Biarritz qui avait manifesté le désir de recevoir les Délégués et Experts du Conseil International pour l'Exploration de la Mer.

Le Conseil International était représenté à cette Conférence par son Président: le Professeur Johan Hjort et par son Secrétaire Général: le Dr. H. Blegvad.

Étaient également représentés les pays suivants:

Belgique: M. Ch. Gilis, Attaché au Ministère des Transports, Administration de la Marine, Ostende.

Danemark: M. Dr. H. Blegvad, remplaçant le Dr. E. Poulsen, Station Biologique Danoise, empêché.

Espagne: M. Dr. Francisco Navarro, S/Directeur de l'Institut Océanographique, Chef du Département de Biologie, Madrid; M. Dr. J. M. Navaz, Directeur du Laboratoire océanographique de Saint-Sébastien.

Grande Bretagne: M. Dr. W. C. Hodgson, Fisheries Laboratory, Lowestoft.

Norvège: M. Johs. Sellæg, Département des Pêches, Oslo.

Pays Bas: M. Dr. B. Havinga, Directeur de l'Institut Royal pour l'Exploration de la Mer (empêché d'assister à la réunion).

Portugal: M. Dr. Alfredo S. M. de M. Ramalho, Directeur de la Estaçao de Biologia maritima, Lisbonne; M. H. Vilela, Estaçao de Biologia maritima, Lisbonne.

Suède: M. Dr. A. R. Molander, Lysekil.

France: M. J. le Gall, Président du Comité du Plateau Continental Atlantique, Directeur de l'Office Scientifique et Technique des Pêches Maritimes, Paris; M. le Prof. L. Fage, Membre de l'Institut, Professeur au Muséum d'Histoire Naturelle, Paris; M. le Prof. H. Heldt, Directeur de la Station Maritime de Salammbô; M. le Dr. R. Dieuzeide, Directeur de la Station Maritime de Castiglione; M. J. Furnestin, Directeur du Service des Pêches à Casablanca; M. P. Desbrosses, Inspecteur Général de Biologie à l'Office des Pêches Maritimes, Paris; M. R. Letaconnoux, Chef de Laboratoire à la Rochelle; M. J. Ancellin, Chef de Laboratoire à Boulogne-s/Mer; M. Faure, Chef de Laboratoire à Lorient; M. Forest, Assistant de Biologie à Concarneau; M. Postel, Assistant de Biologie (A.O.F.); M. Morice, Assistant de Biologie à Banyuls-s/Mer; Melle J. Fleury, Chef du Service Plancton.

Procès-Verbal.

I. Séance d'Ouverture.

La séance d'ouverture se tint le lundi 20 Avril 1948, au Musée de la Mer sous la présidence de M. Guy Petit, Député, Maire de Biarritz qui, après avoir souhaité la bienvenue aux Délégués et Experts, les invita à commencer leurs travaux sous la présidence de M. J. le Gall, Directeur de l'Office Scientifique et Technique des Pêches Maritimes, Président du Comité du Plateau Continental Atlantique, chargé par le Conseil International d'organiser cette conférence.

Après un rapide exposé général des multiples problèmes que pose la biologie de la Sardine, celle du Sprat, de l'Anchois, Clupéidés dont la pêche et le traitement des produits pêchés constituent pour la plupart des pays représentés un facteur des plus importants dans l'économie nationale, M. J. le Gall rappelle brièvement les travaux de la première Conférence de la Sardine tenue à Lisbonne en 1930, les méthodes de travail qui y furent discutées et recommandées, ainsi que les premiers résultats obtenus au cours des recherches antérieures.

Il rappelle également la décision prise lors de la dernière Assemblée du Conseil International à Copenhague par les Délégués et Experts Espagnols, Portugais et Français de commencer immédiatement des recherches en collaboration sur un programme bien défini et se réjouit de constater que, parmi les rapports présentés, plusieurs donnent déjà les résultats de ces travaux effectués en commun qui pourront servir de base à des discussions fructeuses pour l'établissement d'un nouveau programme de recherches futures.

De nombreux et intéressants rapports ayant été présentés et leurs résumés ayant été mis en circulation, le Président propose aux experts, pour ne pas allonger inutilement la durée de cette Conférence et laisser plus de place à la discussion des travaux présentés, d'examiner d'abord en réunion générale:

A. Le systématique des Clupéidés étudiés;

B. les méthodes de recherches et la technique biométrique applicables à l'étude de ces Clupéidés; puis, d'étudier en comités distincts les résultats des travaux présentés sur:

C. et D. la biologie de la Sardine et de la Sardinelle;

E. la biologie du Sprat;

F. la biologie de l'Anchois;

G. la pêche de ces Clupéidés

et de se retrouver dans une dernière réunion plénière pour tirer la Conclusion Générale des Travaux de la Conférence.

Ce programme de travail ayant été approuvé, l'examen des rapports présentés est commencé.

II. Discussion des Travaux Présentés.

A. Systématique des Clupéidés.

Après un exposé très général de M. Jean le Gall sur la systématique des Clupéidés les plus importants pour l'industrie des pêches maritimes dans l'Atlantique Nord et ses mers tributaires, M. Luis Lozano Rey présente un intéressant travail sur: "L'étude systématique des Clupéidés et Engraulidés de l'Espagne, du Maroc et du Sahara Espagnol" dans lequel — après avoir exposé dans un tableau dichotomique permettant de reconnaître rapidement les différentes espèces nord-atlantiques et méditerranéennes de ces deux familles — il passe en revue les différents genres, espèces et sous-espèces de la famille des Clupéidés, puis le genre *Engraulis*, espèce: *Engraulis encrasicholus*, de la famille des Engraulidés.

Cet exposé est suivi d'une discussion à laquelle prennent part: M. le Professeur Hjort, le Professeur Fage, MM. le Gall, Navarro, Furnestin et le Dr. Dieuzeide, dont il ressort que, devant l'imprécision de certains caractères distinctifs de plusieurs espèces de Clupéidés de la côte occidentale d'Afrique, l'étude biométrique de ces caractères faite sur de nombreux exemplaires est indispensable pour arriver à des conclusions précises.

Il apparaît encore que la systématique des Aloses, particulièrement celles de la Méditerranée ou plusieurs sous-espèces ont été rapidement créées, devra être revue à la lumière de recherches biométriques portant sur de nombreux individus provenant des localités les plus diverses.

Le Dr. R. Dieuzeide expose ensuite un travail sur: "*Sardinella maderensis* Lowe (= *S. granigera* (C.V.)) sur les côtes Nord-Africaines" dans lequel il confirme la synonymie de *Sardinella maderensis* Lowe, signalée à Mogador, Madère, les Iles Canaries avec *Sardinella granigera* C.V. de la Méditerranée, et relève la présence régulière de cette espèce pendant le printemps, l'été et l'automne dans la région d'Alger et de Mostaganem au voisinage de points où des apports importants d'eau douce viennent diminuer la salinité de la mer.

Les conclusions du Dr. Dieuzeide confirment ainsi celles de M. Lozano Rey au sujet de cette espèce.

B. Techniques Biométriques.

Le Président Jean le Gall propose aux experts réunis de prendre pour base de discussion les "Recommandations" de la première Conférence des Experts à Lisbonne quant aux techniques biométriques à employer et aux caractères morphologiques (numériques et métriques) et biologiques à retenir pour l'étude biométrique de la Sardine.

D'une façon générale, ces techniques ont été employées depuis cette conférence. Elles ont pu être jugées maintenant par les experts qui seront appelés à donner leur avis et, le cas échéant, modifiées en conséquence.

a) *Recommandations de la Conférence de Lisbonne 1930.*

Caractères morphologiques et biologiques à retenir dans l'étude des populations sardinières.

1) Caractères morphologiques.

Caractères numériques — Caractères considérés comme définitivement fixés une fois la période larvaire terminée:

— Nombre de vertèbres: comptées du condyle occipital non compris à l'urostyle compris.

— Nombre de rayons aux nageoires pectorales. Somme des rayons des deux nageoires (retenue accessoirement).

— Nombre d'écailles de la carène ventrale. Bien que ce caractère soit imprécis et d'une observation difficile (retenu accessoirement).

— Branchiospines. Forme et nombre des branchiospines: Etude préconisée pour les populations du Golfe de Gascogne et de la Manche pour comparaison avec résultats obtenus sur la côte ibérique et méditerranéenne.

Caractères métriques — Caractères considérés comme variables après la période larvaire et fixés à l'état adulte.

Proportions diverses du corps en fonction de la longueur totale, mesurée du bout du museau au milieu de la ligne joignant les extrémités de la caudale en extension normale (= L).

Proportions retenues:

Di = L/D D = Distance prédorsale comptée du bout du museau à l'origine antérieure de la nageoire dorsale.

Vi = L/V V = Distance du bout du museau à l'origine antérieure de la nageoire ventrale.

Ai = L/A A = Distance du bout du museau à l'origine antérieure de la nageoire anale.

an = 100 *a*/L *a* = Longueur de la base de la nageoire anale.

ds = 100 *d*/L *d* = Longueur de la base de la nageoire dorsale.

T = 100 *t*/L *t* = Longueur latérale de la tête mesurée du bout du museau au bord postérieur de l'opercule.

2) Caractères biologiques.

Taille. Mesurée ainsi qu'il a été indiqué au chapitre précédent et ramenée au $^1/_2$ cm. inférieur. Une correction de 0·250 sera ajoutée pour le calcul des moyennes.

Tout autre méthode employée devra être mentionnée dans la publication des résultats.

Poids. Le nombre d'individus au kilogramme peut être retenu, en remarquant toutefois que cette notion peut être sujette à caution dans les régions où la sardine se pêche au moyen d'appât, le contenu stomacal des poissons étant alors fréquemment abondant.

Stades de maturité. Après une discussion complète, les experts retiennent les stades de maturité de I à VIII tels qu'ils ont été définis pour le Hareng par J. Hjort et précisés ultérieurement pour la Sardine par J. le Gall (Rev. Trav. Office Pêches, T. III, Fasc. I. 1930).

Quantité de matières grasses. Devant les difficultés d'interprétation de ce caractère, les experts tout en reconnaissant son importance au point de vue pratique, ne le retiennent pas comme caractère biologique précis.

La quantité de graisse mésentérique peut être cependant prise en considération comme une indication des stades de maturité spécialement dans les cas douteux: au stade III, la graisse mésentérique est encore abondante; elle disparaît graduellement au cours des stades IV et V.

Croissance. Etude des valeurs successives de L_1; L_2; etc.

b) *Technique Opératoire et Interprétation des Résultats.*

Les experts préconisent de faire les mensurations préconisées ci-dessus: (L; D; V; A) entre perpendiculaires, et (*a*; *d*; *t*) au compas: longueur réelle; puis, recherchant l'ordre de grandeur des erreurs techniques possibles conviennent que, dans l'interprétation mathématique des résultats obtenus:

Toute fluctuation de la moyenne supérieure aux valeurs suivantes correspondant à chacune des proportions envisagées, ne pourra être retenue.

Pour Di	Moyenne	2·66	Fluctuation probable		± 0·15
Pour Vi	—	2·35	—	—	± 0·12
Pour Ai	—	1·585	—	—	± 0·06
Pour T	—	20·35	—	—	± 1·77
Pour *an*	—	12·2	—	—	± 1·66
Pour *ds*	—	10·2	—	—	± 1·62

Ils recommandent encore l'emploi des formules suivantes dans l'établissement des fluctuations de la moyenne vertébrale ou de toute autre moyenne.

n = Nombre d'individus examinés.

v = **Variante** = valeur numérique du caractère étudié = Classe.

p = **Fréquence.** Nombre d'individus ayant une valeur déterminée de la variante v.

μ = **Mode.** Variante ou Classe ayant la plus grande fréquence.

a = Ecart à partir du Mode: $a = v - \mu$.

m = **Moyenne.** Moyenne arithmétique de toutes les valeurs particulières.

$$m = \frac{\Sigma pv}{n}.$$

b = Différence entre Mode (μ) et Moyenne (m)

$$b = m - \mu$$

$$\text{ou encore } b = \frac{\Sigma pa}{n}$$

$$\text{d'où: } m = b + \mu.$$

$\hat{\sigma}$ = **Déviation Standard:** $\sigma = \pm \sqrt{\frac{\Sigma pa^2}{n-1} - b^2}$.

Quartile $= \sigma \times 0.67449$.
Fluctuation probable de la moyenne. Fl. *m.*

$$\text{Fl. } m. = \pm \frac{\sigma}{n} \times 3.37245.$$

Une démonstration pratique de ces différentes techniques faite ensuite au Laboratoire du Musée de la Mer sur du matériel frais permit aux experts d'exposer leurs méthodes de travail, d'échanger leurs vues et de prendre les conclusions que l'on retrouvera d'autre part.

Différents rapports sur les techniques biométriques sont ensuite présentés et discutés.

M. Pierre Desbrosses: "Introduction à l'étude des caractères morphologiques métriques des Clupéidés", dans lequel l'auteur montre:

— l'irrégularité de la croissance des différentes parties du corps avant et après la métamorphose du poisson;

— l'ampleur minima de la variation de ces caractères suivant le sexe.

L'étude biométrique des populations devra donc prendre en considération la taille des individus examinés et, dans une certaine mesure, le sexe.

Le Dr. P. Creach, empêché d'assister à la conférence, dans un rapport présenté après celle-ci et intitulé: "Notes sur la Biologie et la Morphologie de la Sardine (*Sardina pilchardus* Walb.) dans le fond du Golfe de Gascogne", arrive aux mêmes conclusions et des nombreuses observations faites sur la variabilité des caractères métriques de ce poisson, il conclut: "qu'en dehors de la moyenne vertébrale, seules les valeurs des rapports lcpl, et Ai sont susceptibles de fournir des précisions sur l'origine d'une population de Sardines; et, il remarque que:

— La longueur de la tête et la distance préanale étant fonction de la taille, il conviendrait d'abord de tracer des courbes de références pour chaque race de Sardines. Ensuite, pour pouvoir leur comparer un groupe inconnu, il faudrait procéder sur ce groupe aux mensurations d'un si grand nombre d'individus que cette méthode ne peut être retenue en pratique courante.

M. Jean Furnestin, dans une "Etude comparative de quelques caractères métriques des Sardines du Golfe de Gascogne et du Maroc", constatant, de son côté, que l'indice de variabilité (σ) des caractères métriques diminue du nord au sud suivant l'origine des échantillons, estime qu'au point de vue ichthyométrique, les différentes proportions du corps ont une valeur très inégale:

— les indices Ai et Vi apparaissent comme des caractères médiocres;

— l'indice Di n'a qu'une valeur très secondaire, mais peut être utilisé comme caractère complémentaire;

— l'indice lcpl, bien que très variable au cours de la vie de l'individu, est excellent. Corrélatif de la moyenne vertébrale, il varie en sens inverse de celle-ci, et M. Jean Furnestin conclut également que la formule vertébrale et le rapport lcpl, sont les deux seuls caractères dont l'étude simultanée doit être retenue pour distinguer les différentes populations de Sardines.

Ce à quoi, remarquent le Professeur L. Fage, M. Jean le Gall et le Dr. Ramalho, qu'il convient de ne pas négliger l'étude de la croissance des valeurs successives de L_1, L_2, L_3, etc. puis celle des caractères physiologiques, en particulier l'état de maturité sexuelle des différentes populations examinées.

Ces conclusions ont été prises en considération et retenues lors de l'Assemblée Générale de clôture.

C. Sardine.

a) *Les Rapports.*

De nombreux et importants rapports furent présentés et discutés lors des réunions d'études spéciales consacrées à la Sardine et à la pêche des Clupéidés.

Biologie.

B. Andreu: Quelques données sur la fécondité de la Sardine.

Melle Faure: Note préliminaire sur le Zooplancton de la zone côtière du Maroc.

Massuti et Oliver: Recherches sur la biométrie et la biologie de la Sardine en particulier sur sa nourriture.

Melle Fleury: Nourriture de la Sardine du Golfe de Gascogne.

Populations géographiques.

J. Furnestin: Premières observations sur la biologie de la Sardine marocaine.

J. Furnestin: Les races de Sardines du Détroit de Gibraltar et de ses abords.

Mme L. Belon et F. Navarro: Taille de la Sardine par rapport au sexe et au filet. Observations à Malaga (1940—47).

L. Lozano: Biométrie et Biologie des petites sardines "Parrocha de la Galice".

P. Creach: Notes sur la Biologie et la Morphologie de la Sardine du Fond du Golfe.

R. Letaconnoux: Etude préliminaire sur la Sardine des côtes de Vendée.

Recherches coordonnées.

Ramalho et Vilela: Résultats préliminaires des observations faites sur la Sardine (Leixoes Lisbonne Portimao) depuis Novembre 1947.

Letaconnoux: Résultats préliminaires des observations faites sur la sardine dans le Golfe depuis Octobre 1947.

F. Navarro: Les Clupéidés et l'Anchois des côtes Espagnoles dans l'hiver 1947—48.

Pêche des Clupéidés.

J. le Gall: Aperçu général de la pêche à la Sardine sur les côtes de France.

E. P. Priol: La pêche à la senne tournante en Bretagne.

L. Bellon: Note sur la pêche et l'utilisation de la Sardine des côtes de Malaga.

G. Cuesta: La pêche des Clupéidés dans la Mer Cantabrique.

Vilela et Ramalho: La pêche et l'utilisation de la Sardine au Portugal pendant ces dernières années.

W. C. Hodgson: Démonstration de détection des bancs de Sardines par "echosounding".

E. Postel: La pêche des Clupéidés sur les côtes de l'A.O.F.

L'analyse de chacun de ces travaux ne peut avoir sa place dans ce "Rapport Général";on les trouvera dans le "Rapport Atlantique", Vol. No. 126 de cette série.

Mentionnons cependant les résultats obtenus par B. Andreu dans son étude sur "Quelques données sur la fécondité de la Sardine", qui, après avoir établi le rapport des poids des gonades (mâles et femelles) en fonction du poids des individus et de leur taille, fixe à 29.000 en moyenne le nombre d'œufs dénombrés chez la sardine de Malaga (de 15.000 à 54.000) et comparant ce résultat à celui obtenu par Bietrix qui donne pour la Sardine atlantique le chiffre moyen de 12.000, remarque en même temps que l'œuf de la Sardine atlantique dont le diamètre est voisin de 1 millimètre, est plus gros que celui de la Sardine de la Méditerranée dont le diamètre n'est que de 0·75 mm.

De la discussion qui suivit cet exposé, les experts arrivent à conclure qu'il serait intéressant de poursuivre des observations suivies sur la corrélation Poids total, Poids des gonades sur des Sardines préalablement classées suivant leurs stades de maturité tels qu'ils ont été définis à la Conférence de Lisbonne et, le cas échéant de compléter ce travail par une étude histologique des organes génitaux aux différents stades.

Le Dr. Ramalho en réfère à ce propos à l'excellente étude de S. Clark sur la Sardine de Californie.

Les trois rapports sur la nourriture de la Sardine, bien que ne portant pas sur des échantillons prélevés dans la même région se complètent heureusement.

Melle M. L. Faure étudiant la répartition du zooplancton dans la région côtière du Maroc, montre qu'il existe des zônes à Salpes, à Copépodes ou à Sagitta dans lesquelles ces espèces prédominent ou sont seules représentées. Les zônes alternent, se déplacent saisonnièrement sans se chevaucher tandis que la densité du plancton varie suivant les saisons.

Ces observations éclairent les remarques de Melle J. Fleury et Massuti et Oliver qui arrivent aux mêmes conclusions sur les éléments essentiels de la nourriture de la Sardine: Diatomées, Péridiniens, Copépodes, larves de Crustacés et de Mollusques, œufs de poissons, et sur son régime alimentaire qui ne paraît pas sélectif et varie au cours de l'année avec la distribution saisonnière du plancton; ces conclusions sont confirmées par les observations du Mr. Pinto sur la nourriture de la Sardine des côtes du Portugal où les Sardines vides pour la plupart en Novembre-Décembre, ont ensuite un régime alimentaire où le Phytoplancton domine pendant les mois de Janvier et Février pour être progressivement remplacé en Mars par du Zooplancton (Copépodes etc.).

Le Professeur Fage insistant sur l'intérêt de ces observations concordantes sur la nourriture de la Sardine (et autres Clupéidés), demande qu'elles soient poursuivies non seulement au point de vue qualitatif mais également au point de vue quantitatif.

Les autres rapports présentés sur la biologie de la Sardine apportent surtout des précisions sur les caractères biométriques des différentes concentrations de Sardines étudiées. De ces caractères numériques, métriques et physiologiques établis avec précision dans la plupart des rapports, il apparaît que la moyenne vertébrale reste le caractère retenu par tous les experts pour reconnaître les différentes "populations" que constituent les concentrations étudiées.

C'est en s'appuyant principalement sur ce caractère que J. Furnestin montre que les groupements de Sardines peuplant le littoral marocain constituent une "Race" unique très homogène (caractérisée par une moyenne vertébrale voisine de 50.50) distincte de la race Atlantique Méridionale présente du Détroit de Gibraltar au Golfe de Gascogne (côte cantabrique, à moyenne vertébrale voisine de 51.25) et de la race Atlantique Septentrionale s'étendant du Golfe de Gascogne à la Mer du Nord (à moyenne vertébrale supérieure à 52.00—52.22).

L'accord des experts est unanime sur ces conclusions, mais il n'en est pas de même dans le cas des concentrations observées dans la région du Détroit de Gibraltar où, selon Furnestin, qui a basé ses conclusions sur l'étude des branchiospines et du nombre de vertèbres, doivent se rassembler en groupes ± hétérogènes des Sardines d'origine Marocaine typique (m. v. — 50.85), des Sardines Atlantiques Méridionales (± 51.20) et des Sardines Méditerranéennes (variété *Sardina sardina*) (m. v. 51.40).

De la discussion qui suivit cet exposé et à laquelle prirent part J. Furnestin et F. Navarro, il ressort que des observations méthodiques sont encore nécessaires avant que puissent être prises des conclusions sur le sujet.

Par contre, une certaine divergence d'opinion apparaît dans les conclusions des rapports de R. Letaconnoux et P. Creach, qui ont étudié la Sardine du Golfe de Gascogne, si on les compare à celles de Jean Furnestin dans son important ouvrage "Contribution à l'étude de la Sardine atlantique" paru en 1944. La distinction généralement admise de trois "races" ou "populations" parmi les Sardines de l'Atlantique:

— Population Celtique à moyenne vertébrale supérieure à 52.00.

— Population Cantabrique à moyenne vertébrale voisine de 51.75.

— Population Atlantique Méridionale (Ibérique) à moyenne vertébrale voisine de 51.30,

serait à abandonner pour ne retenir que deux "races":

— une Race Atlantique Septentrionale distincte d'une Race Atlantique Méridionale par une moyenne vertébrale plus forte d'une unité environ dans la Race Septentrionale.

Ces deux races seraient amenées à se mélanger dans le fond du Golfe de Gascogne où la Race Atlantique Septentrionale pourrait se subdiviser en deux "formes": une forme "Armoricaine" et une forme "Aquitanienne" restant cependant unies par des liens d'étroite parenté.

R. Letaconnoux, examinant les Sardines capturées entre Loire et Gironde et étudiant la moyenne vertébrale de ces échantillons groupés suivant des valeurs différentes de L_1, reconnaît la présence dans cette région des deux formes armoricaines et aquitaniennes définies par J. Furnestin.

Mais P. Creach, comparant les résultats des observations de J. Furnestin à ses propres observations, met en doute l'existence d'une population aquitanienne autochtone et explique le polymorphisme des populations qui fréquentent les rives françaises du fond du Golfe de Gascogne (jusqu'à l'embouchure de la Loire pourrait-on ajouter d'après les résultats de R. Letaconnoux) par des apports de la population atlantique méridionale vraisemblablement liés au phénomène périodique des transgressions atlantiques dont l'importance est variable suivant la région considérée et l'ampleur de ces transgressions.

L'expérimentation poussée sur une plus longue période permettra de se faire une opinion définitive sur cette question encore discutée.

b) *Résultats des premières recherches faites en collaboration.*

Lors de la réunion du Comité du Plateau Continental Atlantique à Copenhague (Octobre 1947), les Délégués: Espagnol (M. Navarro), Portugais (Dr. Ramalho) et Français (J. le Gall) décidèrent d'entreprendre immédiatement en collaboration étroite des recherches coordonnées sur un même plan discuté et établi en commun.

Le plan de travail suivant fut retenu et mis en application.

1) Préliminaire à l'étude simultanée de la Sardine sur le Plateau Continental Atlantique.

E: Espagne. — F: France. — P: Portugal.

Zone de travail.

Manche et Mer Celtique: Boulogne (F).

Golfe de Gascogne: Concarneau (F). — La Rochelle (F). — Biarritz (F). — St-Sébastien (E). — Santander (E).

Côte Ouest et Sud Ibérique: Vigo (E). — Porto (P). — Lisbonne (P). — Maroc — Casablanca (F).

Méditerranée: Marseille (F). — Banyuls (F). — Palma de Majorque (E). — Malaga (E). — Castiglione (F). — Salammbô (F) (Tunisie).

Epoque.

Novembre 1947 à Janvier 1948.

Observations à faire.

Longueur totale et longueur latérale de la tête; calcul de l'indice $\left(\frac{100 \text{ long. tête}}{\text{long. totale}}\right)$.

Numération des vertèbres (fréquence et moyenne).

Sexe et état sexuel.

Poids moyen par classes de taille calculées au demi-centimètre le plus voisin, les sardines étant vidées et les glandes génitales pesées à part.

Prélèvement d'écailles pour la détermination de l'âge et de L_1 et L_2 par classes d'âge.

Techniques.

Observer autant que possible les recommandations de la Réunion de Lisbonne (Rapp. et Proc.-Verb. Vol. LXXVII, p. 44, 1932).

Il serait préférable d'examiner des échantillons pris au filet non sélectif; le nombre des échantillons devrait être au moins de 100 par semaine (400 par mois).

2) Il est recommandé de faire des observations sur les espèces suivantes selon les recommandations faites au Comité:

Allache — Anchois — Aloses — Maquereaux — Flétan — Merlu.

Les résultats de ces premières recherches ont fait l'objet des rapports suivants présentés à la Conférence de la Sardine:

F. Navarro: "Les Clupéidés et l'Anchois des Côtes Espagnoles pendant l'hiver 1947—1948". Observations des Laboratoires océanographiques, compilées par Francisco de P. Navarro.

R. Letaconnoux: "Résumé des Recherches effectuées en 1946—1947 sur la Sardine de la Région de La Rochelle"; et de plusieurs exposés de: Ramalho, Jean Furnestin, P. Desbrosses sur les résultats obtenus au cours de ces observations faites: au Maroc (J. Furnestin), au Portugal (Dr. A. Ramalho) et en France (P. Desbrosses).

De toutes ces observations simultanées ayant porté principalement sur la taille, l'indice céphalique, le poids, la corrélation taille et poids, la maturité sexuelle et la moyenne vertébrale des échantillons prélevés, il résulte, avec la confirmation des résultats antérieurement obtenus, une notion plus précise de l'existence des populations précédemment définies que l'on retrouvera par exemple dans les moyennes vertébrales (caractère considéré comme le plus important) établies au cours de ces recherches.

Moyennes vertébrales:

Sardines d'Agadir	50·62
Safi	50·61
Casablanca	50·68
Tanger	50·85
Malaga	51·195
Palma de Majorque	51·51
Côte sud Portugal	51·16
Lisbonne	51·15
Porto	51·20
Vigo	51·19
Fond Golfe Gascogne	52·28
Vendée	52·19
Bretagne	52·13

L'importance de ces premiers résultats incite les experts à recommander la continuation d'une collaboration étroite dans les recherches. Un plan de travail que l'on retrouvera plus bas sous III ("Conclusions") est établi après discussion.

D. Sardinelles.

Peu d'observations sur ce Clupéidé ont été rapportées devant la conférence.

Il en est fait mention toutefois dans les rapports du Dr. Navarro sur "Les Clupéidés et l'Anchois des Côtes Espagnoles pendant l'hiver 1947—1948" (L'Allache de Palma de Majorque par Mlle Valls) et de E. Postel sur "La Pêche des Clupéidés en A.O.F.".

En conséquence, les experts recommandent que les techniques mises en œuvre pour l'étude de la Sardine soient également appliquées pour l'étude de ce poisson relativement abondant à certaines époques sur les côtes de la Méditerranée et sur la côte occidentale d'Afrique.

E. Sprat.

La section "Sprat" réunit ses experts le 27 Avril 1948 à 15 h 30 sous la présidence du Dr. Arvid R. Molander.

Les rapports suivants furent présentés et discutés. (Compte-rendu du Dr. Arvid Molander).

E. M. Poulsen: "L'apparition, la ponte et les races de Sprats dans les Eaux Danoises" (Rapport présenté par le Dr. H. Blegvad).

L'auteur se référant aux recherches danoises sur le Sprat montre qu'il est possible de distinguer parmi les sprats du sud du Kattegat, du Belt et des fjords danois, trois types principaux.

— un type du Sud du Kattegat avec une moyenne vertébrale de: 47·9 à 48·1.

— un type des Belts avec une moyenne vertébrale de: 47·7 à 47·9.

— et un type des Fjords avec moyenne vertébrale de: 47·5 à 47·7.

Ch. Gilis: "Etude sur les concentrations de Sprats sur les Côtes Belges" dans lequel il expose la distribution du Sprat au large de la côte belge, établit leur longueur et leur poids, définit leur maturité sexuelle, leur adiposité et leur âge. Les différentes moyennes vertébrales des échantillons étudiés y étaient également calculées et discutées: 47·31 à 47·69. Moyenne vertébrale 47·50 (cf. Forest 47·68).

L. Faure: "Observations sur le Sprat en Baie de Douarnenez" rapporte dans son travail les recherches faites sur les Sprats de la Baie de Douarnenez, leur croissance et leur moyenne vertébrale: 47·82 (cf. Fage 47·72 et Forest 47·59).

J. Forest: "Remarques sur les concentrations des Sprats sur les Côtes Françaises".

Résultats des observations faites d'Octobre 1946 à 1948 sur la taille, le dimorphisme sexuel et la croissance des Sprats de Lorient, Concarneau, Douarnenez, Honfleur et Dunkerque.

La moyenne vertébrale de ces échantillons, très voisine, varie de 47·58 à 47·72.

Le nombre d'écailles en carène est en moyenne de 33·32.

Arvid R. Molander: "Remarques biologiques sur le Sprat dans les Eaux Suédoises".

Examen des caractéristiques biologiques du Sprat au large de la côte ouest de Suède. Le Dr. Molander montre aussi la présence de "types" suivant le milieu, en mer ouverte, dans les archipels (skerries) ou les fjords, et la corrélation de la moyenne vertébrale de ces types avec la taille des Sprats et l'importance des différentes classes annuelles.

Il montre également la corrélation entre la migration du Sprat, sa pêche et les conditions météorologiques et hydrologiques.

J. Furnestin: "Observations sur le Sprat des Côtes Méridionales de France".

Caractères morphologiques et biologiques des Sprats des côtes françaises de l'Atlantique et de la Méditerranée et différences "raciales" entre ces types.

J. Sellaeg: regrette que l'expert norvégien n'ait pu assister à cette reunion et annonce la présentation à une date ultérieure d'un travail de P. Bjerkan sur la pêche du Sprat et les conditions biologiques du stock de Sprats en Norvège.

A ces travaux, il convient d'ajouter les observations compilées par Francisco de Navarro dans son rapport sur "Les Clupéidés et l'Anchois des Côtes Espagnoles dans l'hiver 1947—1948" donnant la moyenne vertébrale de Sprats capturés à Vigo en même temps que des Sardines entre le 20 Décembre 1947 et le 3 Janvier 1948. Ces Sprats, de 11 à 15 cm. en période de ponte, avaient une moyenne vertébrale de 47·00, le nombre moyen d'écailles en carènes était de 32·92.

F. Anchois.

Les rapports suivants furent présentés au cours de la réunion de cette section le 27 Avril 1948 à 15 h 30.

B. Havinga: "L'Anchois dans les Eaux Néerlandaises après la fermeture du Zuyderzee" (Rapport présenté par M. le Gall).

L'auteur indique dans ce rapport que l'Anchois des côtes de Hollande ne pondait pas uniquement dans le Zuyderzee, qu'une frayère de l'espèce a été relevée dans le Waddenzee à l'ouverture du Zuyderzee, une autre dans l'Oosterschelde et que des œufs ont été trouvés en quantités abondantes en Mer du Nord bien avant la fermeture du Zuyderzee. Les larves ne trouvent cependant pas les conditions de milieu aussi favorables que dans le bassin intérieur du Zuyderzee actuellement clos. On ne sait pratiquement rien sur le déplacement de ces Anchois après la ponte.

J. M. Navaz: "Nouvelles contributions à l'étude de l'Anchois de la Côte Basque".

Etude biométrique: taille, poids, maturité sexuelle, moyenne vertébrale des Anchois du fond du Golfe de Gascogne.

R. Letaconnoux: "Note sur l'Anchois du Golfe de Gascogne" (région de La Rochelle).

P. Creach: "Observations sur l'Anchois du Golfe de Gascogne" (région de Biarritz).

Les anchois de la région de Biarritz prélevés en fin de Mars sont, en moyenne, au stade III. Ceux de La Rochelle prélevés en Juillet sont en période de ponte.

La taille varie de 9 à 16 cm.
Mode: 12 à Biarritz
10·5 à La Rochelle
Moyenne vertebrale: 47·17 à Biarritz
46·95 à La Rochelle

A ces rapports sont venues s'ajouter les observations antérieures de J. Furnestin sur l'Anchois du Golfe (M.V. 47·11), celles de Navarro et Navaz, sur l'Anchois du Pays Basque (M.V. 47·07), de Melle Valls sur l'Anchois des Iles Baléares (rapportées par Francisco de Navarro) qui précisent également les caractéristiques biométriques et, en particulier, les moyennes vertébrales des populations examinées.

G. Pêche des Clupéidés.

Le vif intérêt manifesté autour de cette section spéciale de la Conférence de la Sardine est la démonstration que les vues des savants qui, dans tous les pays représentés à cette réunion d'experts ont consacré leur activité à l'étude des multiples problèmes posés par la biologie des Clupéidés, ne sont pas uniquement spéculatives et que les questions pratiques d'exploitation et de pêche, intimement liées d'ailleurs aux mouvements des bancs de poissons et par suite à leur biologie (au sens large du mot) leur sont familières.

Les exposés et les rapports présentés à la Section "Pêche" de la Conférence de la Sardine:

J. le Gall: "Pêche de la Sardine en France",

E. P. Priol: "La pêche à la senne tournante sur les côtes de Bretagne",

J. Cuesta: "Biologie et pêche de la Sardine à Santander",

Vilela et Ramalho: "La pêche et l'utilisation de la Sardine au Portugal pendant ces dernières années",

L. Bellon: "La pêche et la conserve de la Sardine à Malaga",

Mme L. Bellon et F. Navarro: "Taille de la Sardine par rapport au sexe et au filet de pêche, Observations à Malaga 1940—47",

H. Heldt: "La pêche des Clupéidés en Tunisie",

R. Dieuzeide: "La pêche au feu sur les côtes d'Algérie",

F. Postel: "Pêche des Clupéidés sur la côte occidentale d'Afrique",

W. C. Hodgson: "Démonstration de détection des bancs de Sardines par echosounding",

furent attentivement suivis et longuement discutés; tout particulièrement les questions de pêche au feu et l'intéressant rapport de W.C. Hodgson, sur la pêche de la Sardine à la senne tournante sur les côtes de Cornouailles et la détection des bancs de poissons par le son et l'ultra-son.

Les travaux de cette section de la Conférence de la Sardine furent concrétisés dès le lendemain 29 Avril par M. J. Le Gall au cours d'une assemblée animée tenue au siège du Comité Local des Pêches Maritimes où pêcheurs, armateurs, saleurs et conserveurs, réunis avec les experts du Conseil International manifestèrent par leur attention et les questions posées aux experts présents, l'intérêt qu'ils prenaient à la poursuite des travaux entrepris sur la Sardine au sein du Conseil International pour l'Exploration de la Mer.

III. Réunion Générale de Clôture.

Le Vendredi 29 Avril 1948 à 9 h 30.

Conclusions.

Les experts s'assemblèrent en une dernière réunion générale, au Musée de la Mer, sous la présidence de M. J. le Gall, pour concrétiser les résultats de leurs travaux dans les différentes sections de la "Conférence de la Sardine".

Reprenant successivement les travaux de la Conférence dans l'ordre ou ils avaient été établis lors de la réunion générale d'ouverture, le Président soumet à l'approbation de l'Assemblée les conclusions suivantes:

A. Systématique.

Les discussions qui ont suivi la présentation des rapports de MM. Lozano, Rey et du Dr. Dieuzeide sur la distribution générale et la systématique des Clupéidés de l'Atlantique Nord et des mers tributaires, font ressortir les points suivants:

1) Famille des Clupéidés:
Genre *Sardina Antipa* 1906
espèce *Sardina pilchardus* Walbaum:
Morpha typica
Morpha sardina Risso 1801
Genre *Sardinella* Cuv. et Val. 1847
espèce *Sardinella aurita*
Sardinella granigera = *S. maderensis*
sont suffisamment définis.

Toutefois, une certaine confusion apparaît dans les espèces de la côte occidentale d'Afrique dont l'étude biométrique est encore à faire et sur laquelle l'attention est attirée.
Genre *Alosa* Cuv. 1829
espèce *Alosa alosa* Linné: nettement définie
espèce *Alosa* (*Paralosa*) *fallax* Lacépède: la confusion paraît grande entre les formes:
typica nitolica Geoffroy
algeriensis Regan
rhodanensis Roule
et il apparaît que l'application des techniques biométriques à leur étude permettrait de mieux définir ces différentes "formes" qui peuvent être des simples variétés géographiques de l'espèce *Alosa* (*Paralosa*) *fallax*.

2) Famille des Engraulidés.
L'espèce *Engraulis encrasicholus* est bien définie mais la systématique des Engraulidés de l'ouest africain est encore à faire.

B. Techniques Biométriques.

L'expérience acquise depuis la Réunion des Experts à Lisbonne (1930) qui avait établi une technique biométrique applicable à l'étude de la Sardine se basant sur l'étude d'un certain nombre de caractères morphologiques (métriques et numériques) et biologiques parfaitement définis;

— les résultats des travaux effectués depuis cette date selon cette technique et mis en évidence dans les études déjà publiées ainsi que dans les rapports présentés à cette conférence;

— les discussions qui suivirent l'exposé de ces rapports;

— ont montré que les caractères retenus n'avaient pas tous la même valeur et que, dans la nécessité de travailler le plus grand nombre possible d'échantillons prélevés, certains pouvaient être abandonnés lorsque le but envisagé ne vise pas à une définition biométrique des espèces, des sous-espèces ou des "formes" encore mal connues, mais tend à la distinction de "populations géographiques" d'une espèce déjà bien définie.

Dans ces conditions, les experts reconnaissent que, seuls peuvent être retenus:

Les caractères métriques suivants:

— indice céphalique (*lcpl* = 100 *l*/L) = Longueur latérale de la tête (*l*), mesurée du bout du museau au bord osseux postérieur de l'opercule et calculée par rapport à la longueur totale du poisson mesurée du bout du museau à l'extrémité de la nageoire caudale en extension normale (L);

— la distance prédorsale (D) mesurée du bout du museau à l'origine antérieure de la nageoire dorsale et calculée sous forme d'indice: *di* = L/D.

Parmi les caractères numériques:

— le nombre de vertèbres comptées du condyle occipital à l'urostyle compris, ou, plus exactement: le nombre de disques intervertébraux établi sous forme de moyenne;

— accessoirement, le nombre d'écailles en carène établi sous forme de moyenne, caractère dont la valeur, discutable dans le cas de la Sardine, reste néanmoins intéressant à connaître pour le Sprat.

Les caractères biologiques précédemment définis lors de la Conférence de Lisbonne sont retenus sans observation:

— aucune modification n'est suggérée dans l'interprétation mathématique des résultats.

C. Divers.

Ces conclusions approuvées, les experts recommandent, en outre, que soient étudiés et définis:

— les lieux et époques de ponte de la Sardine et des autres Clupéidés, ainsi que l'établissement d'une carte mensuelle représentant dans chaque région les frayères des espèces étudiées;

— les conditions hydrologiques (températures et salinités) sur ces frayères;

— la nourriture de la Sardine par l'examen des contenus stomacaux. La technique employée par C. F. Hickling (Rapp. et Proc.-Verb. Vol. No. 107, III, p. 26) est recommandée pour cette étude.

Il sera fait abstraction dans cette étude des estomacs remplis d'appâts (rogue, farine d'arachides ou son).

— la croissance et, particulièrement, les différentes valeurs de L_1, longueur calculée sur l'écaille au premier anneau d'hiver;

— la corrélation pouvant exister entre la moyenne vertébrale et les différentes valeurs de L_1.

— la corrélation taille-poids;

— les Sardines profondes capturées au chalut, l'attention étant particulièrement attirée sur l'étude de leurs écailles.

D. Collaboration Internationale.

Les premiers résultats des recherches faites en collaboration suivant le plan de travail établi lors de la réunion du Comité du Plateau Continental Atlantique en Octobre 1947 ont montré l'intérêt de ces recherches en commun.

Les experts prennent la résolution de les poursuivre suivant le même plan général et de transmettre périodiquement les résultats de leurs observations à un rapporteur qui les collationnera, les analysera et adressera aux laboratoires intéressés les données transmises sous la forme de "Tableaux synoptiques".

Les résultats des observations faites seront adressés:

— pour la Sardine: à M. Letaconnoux, Laboratoire de l'Office Scientifique et Technique des Pêches Maritimes à La Rochelle;

— pour la Sardinelle (*Sardinella aurita*): au Dr. Dieuzeide, Directeur de la Station de Castiglione (Algérie);

— pour l'Anchois: à M. Henri Heldt, Directeur de la Station Océanographique de Salammbô (Tunisie).

Les échanges d'écailles montées entre les différents laboratoires sont également recommandés.

E. Biologie des Clupéidés.

1) Sardine.

Quelques faits particulièrement nets ressortent, en définitive, des travaux effectués au cours de ces vingt dernières années sur la biologie de la sardine.

i) La moyenne vertébrale de la Sardine (*Sardina pilchardus* Walb.) de l'Atlantique Nord décroit progressivement du nord au sud.

ii) L'étude biométrique de cette espèce, parfaitement définie, a permis de distinguer dans l'Atlantique Nord trois "Types" actuellement bien définis.

Type **Atlantique Septentrional** caractérisé par une moyenne vertébrale supérieure à 52 et dont l'aire de distribution couvre les Açores, Madère, le Golfe de Gascogne, la Mer Celtique, la Manche avec extension plus ou moins importante en Mer du Nord.

Un Type **Ibérique** à moyenne vertébrale comprise entre 51 et 51·50, présent sur les côtes atlantiques de la péninsule Ibérique.

Un Type **Atlantique Méridional,** à moyenne vertébrale inférieure à 51 (de 50·50 à 51) présent sur les côtes du Maroc et de Mauritanie avec extension probable jusqu'au Cap Juby et Port Etienne.

Ces différents types constituent des "Populations Géographiques" distinctes dont l'aire de distribution n'est pas strictement limitée et qui, suivant les conditions hydrologiques, peuvent se mélanger dans la bordure extérieure de leur domaine.

Ce mélange possible de "Types" distincts dans une région déterminée appelle de nouvelles recherches dans les zones de transition telles le Golfe de Gascogne, où les types déjà définis sous le nom de "Type Cantabrique" ou "Aquitanien" restent contestables.

Le problème de la Sardine Méditerranéenne n'apparaît pas nettement résolu et nécessitera de nouvelles recherches.

2) Sprat.

Les travaux présentés sur la biologie du Sprat conduisent les experts à conclure à la reconnaissance dans les eaux de l'Atlantique Nord de trois types de Sprats actuellement bien caractérisés.

— Un **Type du large** à moyenne vertébrale voisine de 48;

— Un **Type côtier** à moyenne vertébrale voisine de 47·8;

— Un **Type des fjords** à moyenne vertébrale variant de 47·5 à 47·7.

Ces trois types constituent des populations dont l'aire d'extension est actuellement bien définie.

La distinction faite pour le Sprat de trois "Types" distincts suivant les conditions de milieu, est à rapprocher de celle faite pour le Hareng (*Clupea harengus* Linné) où "Trois Types" ont été reconnus également:

— le **Type Atlantique** à moyenne vertébrale voisine ou supérieure à 57·00;

— le **Type côtier** à moyenne vertébrale comprise entre 56·30 et 56·90;

— le **Type des eaux saumâtres** à moyenne vertébrale inférieure à 56·20.

(Voir J. le Gall: Le Hareng (*Clupea harengus* L.). Les populations de l'Atlantique Nord-Est. Ann. Inst. Océanogr., Tome XV, Fasc. 1. Paris 1935.

3) Anchois.

Les travaux présentés sur la biologie de l'Anchois apportent une contribution précieuse à l'étude de ce poisson et montrent la nécessité d'entreprendre l'étude de l'espèce suivant les techniques employées dans les recherches sur la biométrie et la biologie des autres Clupéidés.

F. Pêche des Clupéidés.

Les experts retiennent la recommandation du Dr. Ramalho (Portugal) visant à l'établissement des statistiques des apports de Sardines et autres Clupéidés régulièrement établies par régions.

Ces statistiques donneraient: les quantités débarquées, les zones de pêche; la sardine serait définie par le nombre d'individus au kilo.

Les experts attirent l'attention:

1) sur l'intérêt des recherches poursuivies sur la détection verticale et horizontale des bancs de poissons par le son, ou les ultras-sons ou autres phénomènes vibratoires (sondeurs U.S.; A.S.D.I.C.) et par aéronefs (avion, ballon d'observation, dirigeable). Ils en recommandent la continuation.

2) sur les essais de pêche de la Sardine et autres Clupéidés à la senne tournante et coulissante (Ringnet) et en recommandent la continuation, particulièrement en ce qui concerne l'utilisation d'appareils lumineux pour la pêche de nuit.

G. Conclusion Générale.

A l'issue de la Conférence des Experts (Clupéidés, Hareng excepté) tenue à Biarritz du 26 au 30 Avril 1948, les experts Espagnols, Portugais, Français (Métropole, Algérie, Maroc, Tunisie) réunis:

Considérant que l'opportunité qui leur a été offerte pour la première fois de se réunir pour examiner les problèmes particuliers à l'Atlantique européen a donné d'excellents résultats,

Considérant l'ampleur des problèmes qui se sont posés devant eux pour l'étude de la biologie et du comportement dans leur milieu des Clupéidés (Hareng excepté) et que des problèmes du même ordre et de même grandeur se posent également pour le Merlu, le Germon, le Thon et autres espèces des mers tempérées et chaudes,

Emettent le voeu:

Que l'opportunité de se réunir pour discuter des problèmes hydrologiques et biologiques qui les intéressent particulièrement leur soit encore offerte; et, ils en voient la possibilité dans la transformation du Plateau Continental Atlantique

en Comité Atlantique

qui se subdiviserait, ainsi qu'il a été fait pour le Nord Atlantique en:

1) Comité Atlantique Européen, de St-Kilda au Détroit de Gibraltar;

2) Comité Atlantique Africain, du Détroit de Gibraltar à l'Equateur;

3) Comité de la Méditerranée Occidentale.

Les experts expriment également le voeu que le Conseil International pour l'Exploration de la Mer obtienne la collaboration des Etats Méditerranéens intéressés dans ce Comité.

Rappel de quelques travaux récents

dont il a été fait état au cours des travaux de la Conférence de la Sardine
Biarritz 1948.

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C. F. Hickling: Notes on the Biology of the Cornish Pilchard. (Rapp. et Proc.-Verb., Vol. No. 107, III, p. 26, 1938).

Frances N. Clark: Analyse des populations de la Sardine du Pacifique d'après la moyenne vertébrale. (Fish. Bull. No. 65, Bur. Mar. Fish., State of California, U.S.A., 1947).

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J. le Gall.

APPENDIX 3 A.

Oceanographical Observations from Atlantic Weather Ships.

The following is the substance of the report given by the Chairman of the Committee on Oceanographical Observations from Atlantic weather ships of the Association of Physical Oceanography on the occasion of the meeting of the International Union of Geodesy and Geophysics in Oslo in August 1948.

Dr. R. H. Fleming, Chairman, reported on the work of the Committee on oceanographical observations from Atlantic weather ships. The committee had considered the problems involved in drawing up an international programme. It had at first been thought that there should be a uniform programme but this was now regarded as not possible for the following reasons:

1) It is difficult to keep uniformity when the personnel involved are drawn from so many nations.

2) The facilities available for the work are not so great in some countries as in others.

3) The size of the programme involved is not the same for each country. The United States of America have for instance some 7 or 8 stations which will involve the use of 25 ships. It is clear that any programme that might be agreed for a nation with one station would involve the U.S.A. in an organized programme of a vast size. In this connexion the U.S.A. naturally has to bear in mind the value of such work in relation to competition from programmes in other oceanographical fields. It is also not known how long the programme with the weather ships might be, nor how many ships might eventually be involved.

The U.S.A. were therefore likely only to be able to operate one or two stations specifically for oceanographical investigations.

It had become clear to the committee that the biologists were much interested in the possibilities presented by the weather ships, especially for plankton investigations. Dr. Fleming, therefore, recommended that the committee should be continued but that its composition should be modified so as to have adequate representation from the biological science.

The committee should encourage each country to undertake such observations as their facilities permitted, and should itself act as a co-ordinating and advisory committee to undertake liaison and try to obtain as uniform a development of programmes as possible.

The following were elected as members of the Committee:

Chairman: Dr. R. H. Fleming
Secretary: Professor H. Mosby
Cdr. H. Keyser
Professor M. Knudsen
Cdr. J. R. Lumby
Dr. J. le Gall
Mr. F. S. Russell.

F. S. Russell.

APPENDIX 3 B.

Report on the Meeting of the Association of Physical Oceanography, Oslo, August 1948.

At the meeting two subjects were dealt with which are considered of special interest to the Hydrographical Committee, namely:

1) The future arrangement for procuring Standard Water.

2) The question of oceanographical observations from Atlantic Weather Ships.

(a) The Association has now taken over the responsibility for the preparation of Standard Water from Professor Martin Knudsen. The Standard Water will still be prepared at the Hydrographical Laboratory at Charlottenlund, but, as the Association will contribute to the cost of preparation, it is expected, that the Standard Water will be sold at a price considerably below the actual cost of preparation.

(b) The meeting of the Committee on Oceanographical Observations from Atlantic Weather Ships was attended by: R. H. Fleming, Chairman, H. Mosby, Secretary, and G. E. R. Deacon. Also present were J. R. Lumby and Helge Thomsen.

At the meeting of the Association on August 25th the Chairman presented the following report which was approved by the Association:

"I. It is generally recognized that the Atlantic Weather Ship Program offers a new and unique opportunity for collecting long systematic series of physical and biological observations at fixed points and over repeated routes in the open ocean.

Such data collected over long periods could form a basis for "climatic" studies and would provide a means for preparing synoptic charts. The Committee feels, however, that it is premature to recommend a formal program to be undertaken by all countries participating in the Weather Ship Program.

II. The following factors are believed to be important in planning for any such program:

(a) The number of stations (and vessels) planned to be operated by the several countries varies between a fraction of a vessel to approximately twenty-five.

(b) The actual number of stations in operation is variable and the size and duration of the program is uncertain.

(c) Personnel and equipment are scarce in all countries and hence the exploitation of the Weather Ships will, of necessity, be in competition with other oceanographic programs.

III. In view of the above it is recommended that:

(a) Each country be encouraged to undertake systematic, physical, chemical, geological, and biological observations as their individual facilities and personnel permit.

(b) That the Committee be continued and that its functions shall include:

(i) liaison with the national committees,

(ii) gradual development of a uniform program,

(iii) arrangements for the exchange and for publication af data."

The Committee was extended and consists now of the following members:

Chairman: Dr. R. H. Fleming
Secretary: Professor H. Mosby
Dr. J. le Gall
Cmdr. H. Keyser
Professor M. Knudsen
Lft.-Cmdr. J. R. Lumby
Mr. F. S. Russell.

H. Thomsen.

Reports of Area Committees.

NORTH-EASTERN AREA COMMITTEE

1947

By

GUNNAR ROLLEFSEN

England.

SMALL scale sampling of cod otoliths from commercial trawler catches was continued, the general scarcity of material being due, as hitherto, to "heading" at sea.

A total of 672 cod otoliths was obtained from the Bear Island grounds. From these there are indications that the 1942 and 1943 broods have maintained their promise (suggested in 1946 when they entered the trawl fishery) and appear to be relatively good year-classes. Samples of these were, however, unbalanced to some extent by the rejection of considerable quantities of unmarketable codling at Bear Island, which included some of their lower length-groups. Otoliths of the 1944-brood did not occur in the samples examined. Of the older broods that of 1937 alone contributed to any appreciable extent.

Norway.

Hydrography.

See Hydrographical Committee.

Plankton.

In May and October plankton hauls were made off the Norwegian west coast. The main areas investigated were the Boknfjord, Hardangerfjord, Sognefjord and Nordfjord. A Nansen-net 8/72 was used.

During March to May plankton hauls were made in northern Norway. The ordinary 8/72 and 0/100 nets were used, but the plankton pump and the new Clarke-Bumpus Plankton Sampler were also tried out.

Biology.

Cod. The cod material collected by Norway during 1947 mainly originates from the Lofoten area, but material was also collected in Bear Island and Spitsbergen waters.

From the Lofoten area measurements of approximately 53,000 individuals, age determination of 7,475 individuals and vertebrae counts of 236 mature cod, together with measurements and vertebrae counts of 2,477 cod of the 0-group, have been carried out. From the Bear Island and Spitsbergen waters measurements and age determinations of 3,680 cod have been taken.

2,510 cod were marked in the Lofoten area.

Herring. During the fishery for winter and spring herring, samples were collected for investigations of size, weight, age, type, number of vertebrae, sexual stage and general condition.

A special cruise with a naval ship was made in order to locate the shoals of herring when they entered the coastal waters. Another cruise was made in the autumn to northern Norway for investigations of the fat herring.

Sprat. The sprat population has, as usual, been under regular observation through the investigation of samples collected from purse-seine catches.

Mackerel. The mackerel material was collected on the western and southern coasts of Norway and observations were made on size, age and the number of vertebrae.

Other Investigations.

The work on the problems of artificial hatching and breeding has been continued.

On another cruise with m/c "Johan Hjort" to northern Norway, from August 13th to October 23rd, observations were made on the occurrence of 0-group cod in the littoral region and in the depths of the fjords.

Scotland.

The "Explorer" carried out hydrographic and planktonic observations in July 1947 at a few stations within the Norwegian Deep in the region of Bergen.

The hydrographic data will appear in the *Bulletin Hydrographique*, while the Plankton data can be made available on request at any time.

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Vol. VIII, No. 10, 1947.

PEDERSEN, ELISABETH: Østersens respirasjon, Undersøkelser utført ved Statens Utklekningsanstalt Flødevigen.

Vol. IX, No. 1, 1947.

— Bestemmelse av kalsium i sjøvann. Undersøkelser utført ved Statens Utklekningsanstalt i Flødevigen.

B. Årsber. vedk. Norges Fiskerier.

Årsberetning 1946 (1947).

KOEFOED, EINAR: Fiskerilitteratur 1945—46. Tilføyelser for tidligere år.

Årsberetning 1947 (1948).

Lofotfisket 1947.

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Vol. I, No. 6, 1947.

HJORTH-HANSEN, SVERRE og KÅRE BAKKEN: Undersøkelser over analyse-metoder for ammoniakk og metylaminer i fisk.

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— Fiskeveiðar og frostavetrar. Ægir, Årg. 40, No. 7—8, p. 221. Reykjavik 1947.

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— The number of vertebrae and rays of the second dorsal fin of fishes from the Norwegian coast. Ann. Biol., II. p. 131, Cph. 1947.

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— Fiskeriundersøkelsene ved Svalbard 1946. Fiskets Gang, Årg. 33, No. 3, p. 32. Bergen 1947.

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— Svalbardtoktet i 1946. Meda. Fagtidsskrift for Norges Fiskarlag, Årg. 2, No. 1, p. 7. Trondheim 1947.

EGENÆS, W. NITTER: En fornyelse av meldingtjenesten i Lofoten? Fiskets Gang, Årg. 33, No. 16, p. 198; No. 17, p. 211. Bergen 1947.

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NYMAN, H. B.: Krydrete og saltete hermetiske nedlegninger. Fiskets Gang, Årg. 33, No. 13, p. 167. Bergen 1947.

RASMUSSEN, BIRGER: Notes on the deep-sea prawn in a Norwegian fjord. Ann. Biol., II, p. 10. Cph. 1947.

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NORTH-WESTERN AREA COMMITTEE

1947

By

Å. Vedel Tåning

During 1947 research vessels from Denmark and Scotland operated in the area. From Scotland the "Explorer" visited the Faroe area in June. From Denmark the research cutter "Adolf Jensen" carried out work in West Greenland waters from June to the end of October; moreover the "Dana" carried out extensive work during June and July. Fishery inspection vessels carried out special work at Iceland and in Greenland waters.

Denmark.

Faroe Waters.

The "Dana" operated here during two periods in 1947, viz., 6th June to 12th June and 8th July to 19th July. Trawling with a 50 ft. otter-trawl was carried out at the Faroe Bank and around the Faroes proper. Hauls with the 2 meter stramin net were carried out in several places and the catch of pelagic cod and haddock fry was very high. The eel hand-seine was operated in some fjords and showed a great abundance of 0-group saith. The following fish were marked: 150 lemon sole, about 50 halibut and 100 saith. Hydrographic operations and plankton investigations were carried out as usual.

The hydrographic section from Nolsø to Flugga was worked on the 19th and 20th July.

The oceanic North Atlantic.

From June 14th to July 8th the "Dana" carried out a cruise from the Faroes south to the northern boundary of the Gulf Stream, along the 50° N. Lat. to the waters immediately north of Flemish Cap, and from here to Cape Farewell and East Greenland, returning to the Faroes via the Reykjanes Ridge. Only pelagic investigations were carried out apart from hydrographic observations. Many pelagic animals were obtained from this area, which has been very little explored. The accompanying map shows the position of the stations during this cruise. In some localities bathypelagic hauls were also made. The distribution of pelagic fish fry was studied, especially of the following species: Norway haddock or redfish (*Sebastes*), halibut, Greenland halibut, torsk, blue ling and angler. Eggs of halibut were obtained north and north-east of Flemish Cap. Cod fry was found off East Greenland. Plankton investigations were made at most stations.

Icelandic Waters.

Research work this year was carried out only over the Reykjanes Ridge and over deep water south of Iceland.

Greenland (Paul M. Hansen).

Research work was carried out from the "Adolf Jensen" from June to the end of October in West Greenland waters. In June and the beginning of July the cutter worked in the Julianehaab district and later, in the summer and in the autumn, some reconnaissance work was carried out in North Greenland, especially in the Disco Bay region. The cutter was stationed at Godthaab for the winter, and now and then, when weather permitted, hydrographic observations were made in the Godthaabsfjord, and trawling-experiments with a shrimp-trawl were made in the inner part of that fjord.

Cod. A great number of cod otoliths with length measurements were taken, as in previous years, at the different fishery stations along the west coast; of this material only about 3,000 have hitherto been examined. The age analysis shows that the two year-classes of older fish, 1934 and 1936, and especially the former, have predominated in the commercial catches as in the previous years. About 600 cod were marked at different places.

Fishing experiments were carried out in coastal waters with the eel hand-seine in order to investigate the occurrence of the three youngest age-groups of cod. It was shown that the year-class 1945 (II-Gr.) occurred in great numbers and will probably be of some importance for the first time in commercial catches in 1950—51.

Other fish. Measurements were taken of many samples of different species of fish caught with the shrimp-trawl. A particularly large number of Norway haddock were taken. It was found that the Norway haddock breeds in Godthaabsfjord in water of about 300 m. depth. In some other southern fjords larvae of this fish were taken with a stramin-net.

Shrimps. Hauls were made with a shrimp-trawl in the same fjords where good trawling grounds were found in 1946, viz., Godthaabsfjord, Tunugdliarfik, Lichtenaufjord and Tasermiut, and samples of shrimps were collected. Measurements of shrimps have been made to determine the growth-rate and the age at which change of sex occurs. At Kapisigdlit in Godthaabsfjord trawling was also carried out in the winter. In North Greenland trawling for shrimps was tried in the neighbourhood of Jakobshavn and in the Egedesminde district.

Hydrographic observations were made in the whole of the area where investigations have been carried out, especially in the fjords. As mentioned above continuous hydrographic work was carried out in the Godthaabsfjord during the winter.

Iceland (Árni Friðriksson).

Work at Sea. Since no research vessel was as yet available and it was impossible to obtain a vessel for trawling operations, the work at sea had to be limited to hydrographic and plankton investigations. These were carried out on board various vessels employed in the service of the fishery inspection. The following cruises were made:

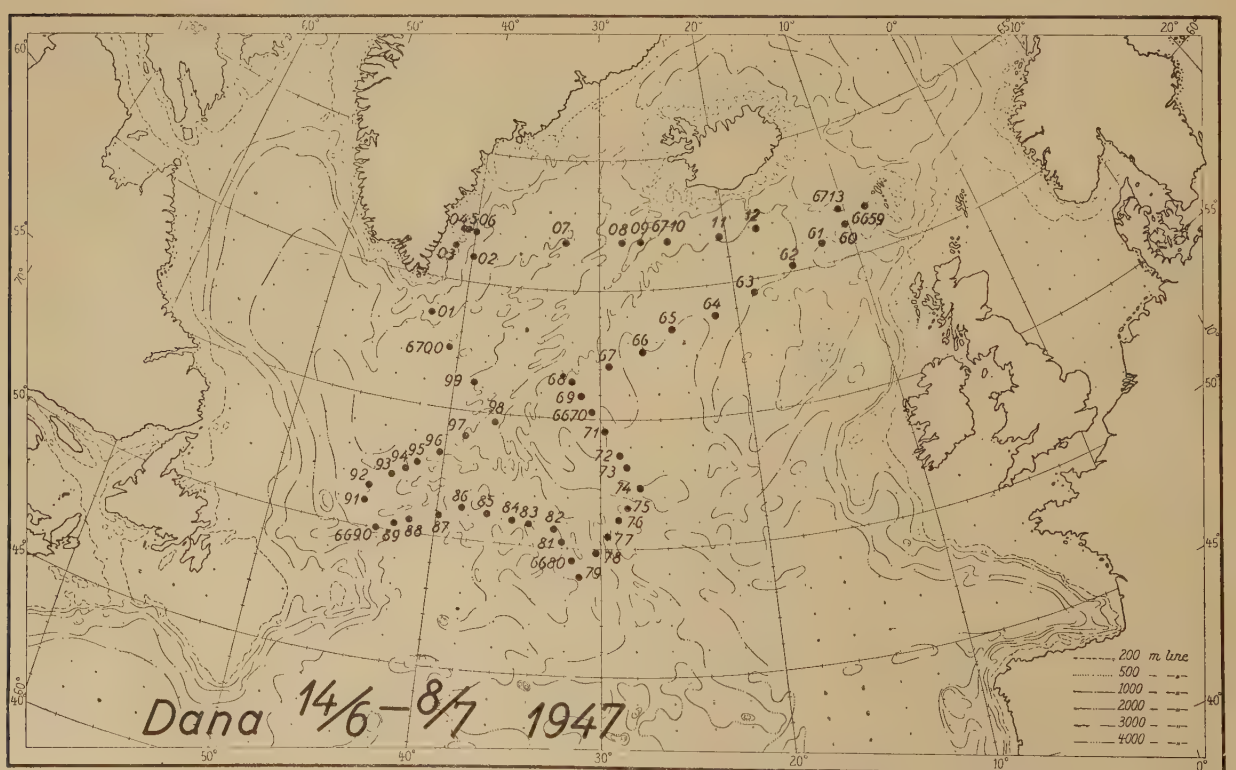
M/S	1947	Stations	Locality
Fanney	13.3 —15.3	30 (1—30)	Faxa Bay
Ægir	20.3 —26.3	42 (31—72)	S. coast
Ægir	1.4 — 6.4	22 (73—94)	—
Skaftfellingur .	8.4 —12.4	22 (95—116)	—
Rifsnes	31.5 —26.6	48 (117—164)	N. coast
Ægir	20.7 —26.8	32 (165—196)	—
Faxaborg	11.12 —12.12	10 (197—206)	—

On these cruises the following observations were made: 380 observations of temperature and salinity; 163 hauls with the Hensen net; 117 hauls with the Nansen net; 70 samples of phytoplankton; 16 hauls with the S. 200 stramin net; 12 samples with the Petersen bottom sampler.

Further, experiments on the use of plankton pumps were made on board M/S "Ægir".

Special investigations were carried out during the period July 15th—23rd in Loch Nýpslón (Vopnafjord, east coast) corresponding to the work in Hamarsfjord, Berufjord and Álftafjord in the previous year. Depth soundings were made in 49 localities, 10 hydrographic stations were worked and 38 bottom samples collected.

Cod. During the year 16,040 cod were measured and 5,158 were examined for age by means of the



otoliths. This material was obtained from different localities as follows (number of otoliths in brackets): Westmanna Isles, S., 1,390 (628), Keflavík, Fax., 3,088 (508), Hafnarfjord, Fax., 1,228 (248), Akranes, Fax., 3,163 (813), Ísafjord, NW., 2,668 (1,507), Dalvík, N., 2,895 (907), Vopnafjord, E., 149 (149), Nordfjord, E., 100 (100) and Hornafjord, SE., 1,359 (298).

Plaice. In Hamarsfjord, on the east coast, special investigations were made on plaice, where otoliths from 537 fish were collected and 300 fish were marked. Further, 230 fish were marked in Faxa Bay, on October 22nd and 23rd.

Herring. The work was continued as in previous years, samples being collected at all parts of the coast. North coast: 2,800 herrings were examined for length, weight, sex, stage of maturity, intestinal fat and number of vertebrae. Age investigations were carried out on 2,786 fish. East coast: A sample of 300 fish was examined in the same way as the north coast herring. South-west coast (Faxa Bay): 5,553 herrings were measured, 3,600 of which were analysed similarly to the north coast herring, except that only 1,600 were weighed. North-west coast: A sample consisting of 336 small herrings (age 1—2 years) were examined for size, sex, stage of maturity, age and number of vertebrae. Thus, in all, 8,989 herrings have been measured, and 7,036 examined in other ways. Stomach investigations on the north coast herring were continued, 133 samples comprising 1,750 stomachs being investigated.

Publications.

The following two manuscripts are now ready for printing:

Einarsson, Hermann, Dr. phil.: Echinoderms (Part 70 of the Zoology of Iceland).

— A paper on the Ammodytes fry in the North Atlantic, based on Danish material from Iceland, Greenland and the Faroes.

Norway.

In the year 1947 investigations carried out by Norway in the Area could only be on a small scale. Two scientists, Mr. Olav Aasen and Mr. Finn Kjelstrup Olsen, went with the naval ship which accompanies the Norwegian fishing fleet during the herring season in Icelandic waters. Owing to the many tasks to be fullfilled by the patrol vessel it was impossible to carry out any specific plan for the scientific work.

Scotland (R. S. Clark).

The research vessel "Explorer" operated in the Faroe Shetland Channel in June from the Butt of Lewis to Faroe Bank and Syderø and again from Fuglø to Flugga in the Shetlands, where the general hydrographic and planktonic conditions were investigated. In addition, trawling was carried out at fixed stations round the Faroes. Of the demersal fish, special attention was given to haddock, cod, halibut and lemon soles.

The serial temperatures and salinities will be found in the *Bulletin Hydrographique*. The plankton conditions have been reported on in *Ann. Biol.* IV.

Further, at periodic intervals throughout the year, measurements and scale samples were taken from haddock and lemon soles landed by commercial vessels at Aberdeen.

PLATEAU CONTINENTAL ATLANTIQUE

1947

Par

JEAN LE GALL

I. Travaux à la Mer.

Hydrologie.

Danemark
Eire } Pas de travaux à la mer dans le secteur du Plateau Continental Atlantique pendant l'année 1947.

Espagne.

Le garde-côte "Xauen", affecté de nouveau à l'Institut Océanographique Espagnol, a travaillé en Avril—Mai 1947 dans la Mer d'Alboran et le Détroit de Gibraltar (opérations hydrologiques et bathymétriques).

En Mai et Juin, le navire hydrographe de l'Institut Hydrographique Espagnol, opérant en collaboration avec l'Institut Océanographique, a effectué une croisière sur la côte de Mauritanie, du Cap Juby au Cap Bojador 26° N.—28° N. (opérations bathymétriques jusqu'à 600 mètres, hydrologiques, pêches planctoniques et documentation pour l'établissement d'une carte de pêche de cette région).

France.

Le désarmément temporaire du navire océanographique "Président Théodore Tissier" n'a pas permis d'organiser de croisières de recherches.

La Frégate "Aventure" de la Marine Nationale a poursuivi ses observations hydrologiques habituelles sur les bancs de Terre-Neuve.

Les Excorteurs "Spahi" et "Grenadier" ont fait diverses observations hydrologiques sur les pêcheries de maquereau sur le Plateau Continental Celte et dans le Golfe de Gascogne en poursuivant des essais de détection des bancs de poissons par Asdic.

Quelques observations du "Chasseur 142" dans les parages de Port-Vendres en Méditerranée Occidentale ont été effectuées au mois d'Août.

L'hydrologie de la zone côtière du Maroc commencée depuis Janvier 1947 à été régulièrement poursuivie.

Quelques sorties ont été faites à bord des chalutiers sur les pêcheries du Plateau Continental Celte du Golfe de Gascogne et du Golfe du Lion.

Grande-Bretagne.

a) Angleterre. Observations habituelles de températures et salinités de surface au bateau feu "Seven Stones" et sur les trajets:

Land's End—Ouessant à l'entrée occidentale de la Manche et

Southampton—Jersey.

b) Ecosse. Observations océanographiques de l'"Explorer" en Août 1947 autour des Iles Hébrides avec opérations de chalutage sur divers fonds.

La région étudiée s'est étendue entre les 56° et 58° de latitude N. et entre le 6° et le 9°30′ de longitude W. Gr.

II. Plancton.

L'étude des échantillons de plancton provenant des croisières et des sorties à la mer a fait l'objet de recherches systématiques dans les laboratoires spécialisés d'Angleterre, d'Espagne, de France et du Maroc. Les résultats ont été déjà publiés ou sont en cours de publication.

III. Sédiments Marins.

L'étude des sédiments marins provenant des diverses croisières atlantiques a été entreprise au Laboratoire de Saint-Sébastien (Espagne) et de Casablanca (Maroc).

Elle est également attentivement poursuivie en France dans plusieurs laboratoires maritimes.

IV. Cartes de Pêche.

M. NAVARRO (Espagne) a publié en 1947 la carte de pêche du secteur Agadir-Cap Juby à l'échelle en 1/500,000.

La carte de pêche du secteur Cap Juby—Cap Bojador est en cours de publication, ainsi qu'une étude de M. LOZANO (Espagne) sur la pêche au chalut dans les parages du Cap Bojador.

Une étude sur les fonds chalutables de la côte d'Afrique, du Cap Spartel au Cap Vert est également en préparation en France.

Les études sur la détection des bancs de poissons par l'ASDIC ont été continuées en France, au Maroc et en Grande Bretagne.

V. Biologie.

A. Clupéides.

Harengs.

Quelques observations ont été faites sur la constitution des bancs de harengs sur la côte d'Irlande (Eire) et sur la côte sud de Bretagne (France).

Sardines et autres Clupéides.

De nombreux et intéressants rapports sur la biologie et le comportement de la sardine, la sardinelle, le sprat et l'anchois ont été présentés par les experts Anglais, Danois, Espagnols, Hollandais, Norvégiens, Portugais, Suédois et Français à la Conférence du Conseil International pour l'Exploration de la Mer qui s'est tenue à Biarritz du 26 au 30 Avril 1948.

Ces rapports feront l'objet d'une publication spéciale.

Sardine. Pendant le mois de Novembre 1947, le navire R.V. "Onaway", opérant avec le bateau écossais "Hope" loué à cette occasion, a poursuivi des essais de pêche sur l'efficacité de la senne tournante et coulissante pour la pêche de la sardine.

Ces expériences ont été poursuivies entre Mevagissey et Plymouth, là où la sardine est ordinairement capturée aux filets dérivants. Les résultats ont été encourageants et les essais ont permis l'établissement du plan d'un filet adapté pour cette pêche.

Il a été constaté que les bancs étaient facilement localisés par une ligne sensible tendue verticalement dans l'eau, ainsi que par écho sondeur. Les meilleures captures ont été faites pendant la nuit.

Les sardines de ce secteur étaient grasses, généralement immatures, ou se préparant à la ponte ou ayant déjà pondu. Il a été constaté qu'elles se déplaçaient dans la même direction que le vent et étaient influencées par la lumière à un point tel qu'elles pouvaient être amenées dans le voisinage de la surface par l'emploi d'un projecteur.

B. Scombrides.

Des mensurations de **Germons** (*Germo alalunga* Gmel) et de **Thons rouges** ont été faites en France. Leur moyenne vertébrale a été étudiée.

De nouvelles méthodes de capture du thon et du germon ont été essayées en France où il a été prouvé que le germon pouvait être capturé dans le voisinage de la surface avec des filets maillants dérivants ou avec des tramails.

Des mensurations de **Maquereaux** (*Scomber scombrus*) et *S. colias* ont été faites sur les côtes françaises de l'Atlantique, de la Méditerranée et du Maroc.

Les mêmes observations ont été poursuivies sur les **Bonités** (*Pelamys sarda* et *Katsuwonus pelamys* et *Euthynnus alleteratus*).

C. Gadidés.

a) Morue (*Gadus morrhua* L.).

L'étude du stock de morues du Plateau Continental Celte a été continuée.

Ces morues appartiennent au type atlantique défini par J. Schmidt avec une moyenne vertébrale de 52.2. Elles doivent faire partie du stock dont les adultes se rassemblent pour la ponte en Mer d'Irlande.

b) Merlu (*Merlucius merluccius* L.).

L'étude de la fluctuation du stock a été poursuivie.

D. Carangides.

L'étude de la caringue ou chinchard (*Trachurus trachurus* L.) poursuivie en France par R. Letaconnoux, a été entreprise sur les côtes de Galice en Espagne par M. Lozano et Massuti (Biométrie et Biologie et Nourriture), Arevalo (composition chimique).

E. Espèces Diverses.

Plusieurs autres espèces de poissons comestibles ont également fait l'objet de recherches suivies, entre autres:

Divers **Gadidés:** *G. minutus*, *Gadiculus thori* par M. Forest et Letaconnoux (France).

Triglidés: *Trigla obscura* par M. Creach (France).

Smarides et **Coryphenides** de la Méditerranée occidentale par M. Lozano et Massuti (Espagne).

Sparidés, en particulier *Pagellus centrodontus* par M. Faure (France).

Anthiidés (*Anthias* et *Callanthias* sp.).

F. Mollusques Comestibles.

Eire. Observations diverses sur la biologie des coquillages comestibles, en particulier sur l'huître et la coquille St. Jacques.

Espagne. MM. Navaz, Rodrigues, Fernandez, Lozano et Andreu ont continué l'établissement d'une carte des gisements comestibles sur les côtes nord et nord-ouest d'Espagne.

France. Le même travail se poursuit en France où M. Lambert rassemble tous les éléments voulus pour la publication des cartes des gisements de Mollusques comestibles des côtes de France, qui continueront la série de celles déjà dressées par Joubin et Guérin Ganivet et publiées par l'Institut Océanographique de Monaco.

Plusieurs autres études sur la biologie des Mollusques comestibles: Huîtres (*Ostrea edulis* et *Gryphea angulata*), Moules (*Mytilus edulis* et *M. galloprovincialis*), Palourdes (*Tapes decussatus*), Clam (*Venus verrucosa*), Bigorneau (*Littorina littorea*), Ormeau (*Haliotis tuberculata*) sont actuellement en cours.

NORTHERN NORTH SEA COMMITTEE

1947

By

R. S. Clark

The position regarding research improved considerably during the year under review and five research vessels of different nationalities operated within the area.

Work at Sea.

The work at sea by the participating countries, and their main objects, were as follows:—

Denmark.

The "Dana" carried out general oceanographical work on the way to and from Iceland. The vessel called at Aberdeen at the end of July and useful contacts were made between the Danish and Scottish workers.

Observations were made on the Fladen herring from a commercial vessel using a special trawl.

England.

Comparative tests were made off the Firth of Forth in November between the trawls of the "Explorer" and the "Sir Lancelot".

Market measurements of cod, haddock and plaice were undertaken.

The North-East Anglian area was investigated in an effort to co-operate with Scotland in the search for the Firth of Forth herring and/or their progeny.

Holland.

Observations on the catch of the Dutch herring drift-net luggers and the data collected on locality, time and size of catch, etc. have been presented in the form of charts.

Norway.

Hydrographic cruises were carried out between Norway and the Shetlands.

Scotland.

The usual representative monthly cruises were effected, except during the first quarter of the year. The Faroe-Shetland area was investigated in June, and the west coast of Scotland, including outer and inner Hebridean waters, in August. The main object was the continuance of investigations into the principal fish species (haddock, herring, lemon sole, etc.) and the prevailing environmental conditions.

The continuous plankton recorder was operated on steamship routes as arranged from the Leith substation of the Hull Oceanographic Institute.

The new herring research vessel "Clupea", run jointly by the English and Scottish Departments, was commissioned in late autumn and proceeded to investigate the causes of the failure in the winter fishery of the local community of Firth of Forth herring.

Experiments were carried out on the effect of the enlarged mesh (80 mm.) in seine and trawl on the fish populations.

Sweden.

Hydrographic cruises across the North Sea were carried out by the "Skagerak" during May and October. In August, the vessel trawled for herring on the Fladen ground and called at Aberdeen in September—a visit which provided an opportunity for contact between the Swedish and Scottish research workers. Investigations on ling were continued. A statistical review of haddock and witch landings by Swedish vessels is being prepared.

The other countries represented on the Committee were unable to carry out active investigations within the area.

General Review.

Further exchanges of herring scale material were effected, while requests were also met for an interchange of larval and adult sandeels. The production of the special herring charts has been unavoidably delayed.

Some haddock material was obtained from Holland and England.

The Fishery Officers of the Scottish Home Department continued to send specimens and particulars of all rare fish caught commercially in Scottish waters to the Laboratory at Aberdeen. This liaison work has been maintained over a long period of years and is a valuable contribution towards the problem of the biological exchanges between the Atlantic and the North Sea.

Participation by Scotland in the I.C.A.O. scheme of meteorological observations was postponed by reason of shortages in equipment.

Grateful acknowledgment is again made to Danish, Norwegian and Swedish colleagues for their co-operation in the prosecution of the Scottish drift-bottle experiments.

Contributions by members were made to the Special Meeting on the "Effect of the War on the Stocks of Fish"—vide Rapp. et Proc. Verb., Vol. No. 122.

A joint programme, prepared by the Chairmen of the two North Sea Committees, was issued in February 1948 as a target recommendation for general research in the Northern North Sea as a whole.

There were no separate publications issued during the year (apart from those in the Council's series) on the work carried out within the area.

SOUTHERN NORTH SEA COMMITTEE

1947

By

R. S. Wimpenny

Although the difficulties left over from the war had not disappeared during 1947 an extension in the scope of their work was possible for most of the nations working in the Committee's area. Some of the salient features connected with the war's effect on the fishery became apparent during the course of the work, particularly that connected with the effect of different intensities of fishing.

Work at Sea.

Belgium.

The motor vessel "Hinders" was allotted to fishery research work during the year. Between May 14th and September 8th this vessel was employed trawling for flatfish in connection with an otolith investigation. From 4th—9th September the "Hinders" carried out a comparative fishing experiment with the English research vessel "Platessa". All this work was done on the trawling grounds in the immediate vicinity of Ostend. Between 3rd and 5th April a comparative fishing experiment was arranged in the neighbourhood of the Brown Bank between the Belgian motor trawler N. 756 "De Vrede" and the "Platessa".

Denmark.

Cruises were carried out by the "Dana" during the month of May and again in late July and in the first half of August. After having co-operated with the other research vessels participating in the international hydrographic scheme during two periods in the month of May, plaice investigations were made in the central part of the North Sea most frequented by Danish seiners. The marking of seine-caught plaice, routine trawling to collect material for the age-determination of the important species and plankton net hauls were also carried out.

Between 3rd and 9th August the "Dana" participated in a comparative fishing experiment of 40 hours trawling with the English research ship "Platessa". The fishing took place on Winterton Shoal and off Smith's Knoll lightvessel.

Some plaice marking was done on a small Danish seiner in October, and in June, August and October the young-plaice trawl was worked from a small motor boat in the Waddensea area.

England.

The steam trawler "Sir Lancelot" and the M.F.V. "Platessa" worked throughout the year in the Committee's area, the former ship doing 28 and the latter 32 cruises. The "Sir Lancelot" did the Flamborough Line of stations each month and also made eight cruises investigating the plankton, hydrography and benthos, mainly in the south-western North Sea, in connection with the herring fishery. Seven cruises in the same area in the early part of the year were devoted to a survey of the plaice egg grounds.

Six cruises of both "Sir Lancelot" and "Platessa" were occupied by tests of trawl gear and comparative fishing experiments with each other and other fishing vessels. These latter included tests against the Danish and Scottish research vessels and against Dutch commercial motor trawlers.

Plaice marking in the eastern Channel was undertaken by both vessels, but the bulk of the marking was done in the Smith's Knoll area of the southern North Sea by the "Platessa".

The M.F.V. "Onaway" operated from the north-east coast of England in the spring and early summer and from Plymouth and Mevagissey in November. During the intervening period this vessel was laid up at Lowestoft in order that the hull could be lengthened by 10′ and a 120 h. p. diesel engine installed to replace a 40 h. p. semi-diesel. The "Onaway" now does nine and a half knots in place of her former speed of a little over five.

France.

1. Bateau-feu "Sandettié": les observations à bord du bateau-feu seront reprises dès que ce navire aura repris son activité normale.

2. Des observations hydrologiques ont été effectuées à bord de l'escorteur "Spahi" de la Marine Nationale.

3. Des travaux hydrologiques et des prises de plancton ont été effectués en Mer du Nord, jusqu'au "Dogger Bank" en janvier, avril et décembre 1947 à bord de chalutiers en pêche.

Holland.

Although no research ship was available during the year some work on the effect of the size of mesh on the catch of fish was carried out on two Texel cutters. Texel cutters were also used in a comparative fishing experiment with the English research vessel "Platessa".

Norway. Poland. Sweden. No sea work carried out in the area in 1947.

Scotland.

The Scottish research ship "Explorer" entered the southern North Sea area north of the Dogger and between the Dogger and the English coast in May and September in order to carry out plankton, hydrographic and trawling investigations.

Work on the Fish Species.

General.

Market measurements were continued at Lowestoft, North Shields and Grimsby, where the following numbers of North Sea fish were dealt with:—

	North Shields	Grimsby	Lowestoft	Total
Cod.....	24,136	7,240	—	31,376
Haddock.....	—	9,480	—	9,480
Plaice.....	—	60,350	92,330	152,680
Soles.....	—	—	8,040	8,040

From the eastern Channel 13,910 plaice were measured at Hastings and Rye. Market measurements of plaice from 32 landings were obtained at Esbjerg in March and October.

Cod.

In addition to the market measurements made at North Shields and Grimsby, market samples of this species were taken from Danish seiners at Esbjerg.

Haddock.

The Scottish research ship "Explorer" collected material as part of the Scottish annual survey of haddock when she was in the area near the Dogger in September.

Whiting.

Some measurements of this species were made on board French trawlers fishing on the Dogger Bank.

Plaice.

A survey of the plaice spawning grounds of the south-western North Sea and English Channel made by the English research ship "Sir Lancelot" was partially completed by March. Plankton and plaice eggs were counted. It appeared that the plaice egg production was between two and three times the pre-war production of the species. The Danish young plaice investigations were continued in the Waddensea where 41 stations were investigated in June, August and October. An examination of the food of the 0—III-group plaice living in the Waddensea and an assessment of the corresponding bottom fauna was continued as part of a general survey of the fish food of the area. Otolith investigations have been continued by Holland, but the work is no longer restricted to the back-calculation of growth during the war years. During the investigations some doubt has arisen as to the accuracy of reading and measuring the annual rings and a start has been made on a more fundamental enquiry into the growth of the otoliths and the formation of the annual rings.

Otolith samples for age determination together with individual weights and lengths for each sex numbering over 13,000 were taken at the English ports of Grimsby, Lowestoft, Hastings and Rye. The census revealed that the fishing for plaice was more intense in 1947 than in 1938.

Danish workers on a small Danish seiner marked and released 2,105 plaice mainly between 30 and 50 cm. long between 13th and 18th May, 29th July and 11th August, and 10th to 13th October. The grounds chiefly concerned were the Dogger Bank area and Clay Deep.

On the cruises of the English research ships "Sir Lancelot" and "Platessa" 11,000 plaice were marked and released, 3,526 were returned during the year. Most of the releases were made in the North Sea often in the Smith's Knoll area, but 2,421 were marked in the Rye Bay neighbourhood in order to obtain an idea of the movements and identity of that stock.

Sole.

A beginning of an intensive study of this species has been made in Holland.

Herring.

The English herring investigations were resumed on the north-eastern and Yorkshire coasts in the spring and summer and continued in the East-Anglian fishery in the autumn. To sample the latter fishery 151,400 fish were measured at Lowestoft and Yarmouth curing houses and 2,600 scales were read at the Lowestoft Laboratory in order to provide an age census. A successful prediction of the East-Anglian fishery was made, based partly on the results of the previous season's age census.

Observations on length, age, sexual maturity, length and vertebral number of the herring shoals of the southern North Sea were continued by France. The regular assessment of the winter spent herring fishery was continued at Ostend and samples of herring from the Fladen and Gut populations were also collected by Belgian workers. A report on the Belgian spent herring fishery of 1946—47 will appear in *Annales Biologiques* IV.

In Holland data were collected on the locality and time of the catches of the Dutch drift-net herring from a large number of herring lugger journals. The data will be summarised and put on maps for different months of the year. This data will fit into the Council's general series of maps of the herring fisheries.

Pilchard.

In November the English research vessel "Onaway" in company with a commercial ring-net vessel was sent to investigate the use of the Scottish ring-net in the Cornish pilchard fishery. A useful adaptation of the gear was devised and useful observations were made on the fat-content, maturity and age-composition of the shoals.

Rational Fishing.

In England the mathematical formulation of the changes in the effects of different intensities of fishing on fish stocks was completed, and the method was being applied to data from the plaice.

The second step, that of giving precise values and equivalents to the efficiency of different ways of reducing fishing intensity, was undertaken in order that the necessary information could be supplied for international negotiations on this subject. Theoretical and practical advances were made in this direction. The number of comparative fishing and mesh experiments made in support of this work was, however, far short of that required.

Comparative fishing or mesh experiments were also made by Denmark and Holland. A special study of stock density in different areas was made by Holland by the use of statistics giving the catch per unit time.

Aids to Fishing.

Asdic.

Herring shoals were successfully located in the southern North Sea by the French corvette "Spahi".

Echo-sounding.

In connection with the English investigations into the herring of the Yorkshire coast and the pilchard of the Cornish coast some useful information on the location and behaviour of the shoals was obtained by the use of echo-sounding apparatus.

Publications.

Baerends, G. P.: "De rationale exploitie van den zeevischstand in het bezonder van den vischstand van de Noordzee". Verlagen en Mededeelingen van de Afdeeling Visscherigen. No. 36, 1947.

— "A Survey of the Dutch Fishing for Demersal Seafish in the years 1939—1945". Ann. Biolog. Vol. II, 1947.

Bertelsen, E.: "Cod and Haddock". Ann. Biolog., Vol. II, 1947.

Gilis, Ch.: "La campagne du hareng guai 1944—45". Ann. Biolog., Vol. II, 1947.

Hodgson, W. C.: "The East Anglian Herring Fishery in 1945". Ann. Biolog., Vol. II, 1947.

Jensen, Å. I. C.: "Changes in the Stock during the War and the Danish Fishery in the North Sea". Ann. Biolog., Vol. II, 1947.

Smed, J.: "The Variation from year to year of the Surface Temperature in the southern North Sea". Ann. Biolog. Vol. II, 1947.

Tåning, Å. V.: "Observations on Young Plaice in the Danish Waddensea during the War". Ann. Biolog., Vol. II, 1947.

Wimpenny, R. S.: "The Rye Bay Plaice Stock in the War of 1939—1945". Ann. Biolog., Vol. II, 1947.

TRANSITION AREA COMMITTEE

1947

By

AAGE J. C. JENSEN

Denmark (AAGE J. C. JENSEN).

Hydrography.

Observations of temperature and salinity were made during the experimental fishing.

Plankton.

Samples of macroplankton were taken each week by vertical hauls from the lightships Anholt Knob, Schultz' Grund and Halskov Rev.

Benthic Food.

Valuations of the bottom were made with the Petersen bottom sampler in the Limfjord and with the van Veen bottom sampler in the Isefjord.

The Fish.

Eggs and Larvae. Fishing experiments were carried out in June from the S.S. "Biologen", using the Hensen net and the ring-trawl in the Limfjord and using the ring-trawl (especially for the investigation of the sprat) in the Isefjord.

Flat Fish. The density of the 0-group of plaice, flounder, turbot and brill was investigated in July and August along the coasts of the Sound, the Belt Sea, the Kattegat and the Skagerak. The Johansen young-plaice trawl was used from the M/B "Havkatten" for this work.

The plaice transplanted from the western part of the Limfjord to the central and eastern part of this water, the Belt Sea, southern Kattegat and the Sound were examined for age and race. 70,000 kg. young plaice were transplanted within the Limfjord and 62,175 kg. to the southern part of the Transition Area.

Samples of commercial plaice from those areas in the Belt Sea where transplantations were carried out have been examined for length and age, in order to test the results of the transplantations.

Market measurements and some age-investigations of commercial plaice have been carried out at several fishing ports.

Quantitative fishing experiments to determine the density of stock and the length and age distribution of commercial species of demersal fish were carried out using the eel-tog and commercial eel-trawl. These were made from the S.S. "Biologen" in June and from the M/B "Havkatten" in August and September.

Herring. Commercial catches from various waters were analysed for length, age, maturity and racial characters.

Sprat. Commercial catches from various waters were examined for racial characters.

Waste fish. Length measurements were made of each species of waste fish caught in fish ponds for food, meal and oil.

Predictions of the yields of the mackerel and silver eel fisheries have been given.

Publications.

BLEGVAD, H.: "Fiskeriundersøgelser i Farvandene omkring Danmark". Dansk Fiskeritidende, pp. 177, 194, 1947, and Vestjysk Fiskeritidende, 10. April and 24. April, 1947.

v. DEURS, I. A. S., JENSEN, AAGE J. C. and LARSEN, ALBERT under Medvirkning af JUL, MOGENS: "Havet og Fiskerierne". Udg. Dansk Biolog. Stat., København 1947.

HEEGAARD, P.: "Investigations on the Breeding Season and the Quantities of Eggs of the Food-Fishes of the Kattegat and the Northern Belt Sea. 1929—1941". Medd. Komm. Danmarks Fiskeri- og Havunders., Bd. IX Nr. 4, 1947.

Norway.

The Flødevig Sea-Fish Hatchery, Arendal (ALF DANNEVIG).

Hydrography.

Observations of the temperature and salinity of the sea water were taken every working-day at Flødevigen at 0, 1 and 15 metres below the surface.

In the neighbouring parts of the Skagerak and in the Oslofjord 103 hydrographical stations were worked. 16 additional stations 5 sea miles SE. of Torungen were carried out during May in co-operation with the northern countries.

Biology.

Eggs and Larvae. Owing to the presence of ice, hauls with plankton nets were not started until mid April. Material was collected from 32 stations, 128 hauls were made with the egg-net and 64 with the larva net. The material is partly sorted. The material collected in 1946 has been worked out.

Cod. The 0-group. Experimental fishing with a land-seine in the littoral region was carried out according to the pre-war scheme, 77 hauls being made on the Skagerak coast and 58 in the Oslofjord.

Older cod. Experimental fishing with traps was carried out at Flødevigen.

Herring. Scales were taken from 3 samples comprising 747 individuals.

Lobster. Statistics from individual fishermen have been collected according to the pre-war scheme.

The **Cod Hatchery** was not used because of the difficulty of obtaining spawners, the water being too cold.

The rearing of **lobsters** gave good results. From 238 berried lobsters about 160,000 larvae were collected. Rearing resulted in about 42,000 in the bottom stage and 5,000 in younger stages.

The rearing of **oyster spat** yielded meagre results this year.

Experimental rearing of fish larvae. The hybridisation of *Pleuronectes microcephalus* ♀ with *Pleuronectes flesus* ♂ gave very good results. The *Solea vulgaris* reared at the station in 1946 are still living. The rearing of herring larvae was continued, with some good results.

Publications.

Elisabeth Pedersen: "Bestemmelse av kalsium i sjøvann." Bergen 1947, and "Østersens respirasjon." Bergen 1947.

Alf Dannevig: "The Flødevig Sea-Fish Hatchery, at Arendal, Norway", Journ. du Cons., XV, 1, Copenhagen 1947.

Poland (M. Bogucki).

No research work has been undertaken in the area during 1947.

Sweden (K. A. Andersson).

Biology.

The investigations on the **sprat** were continued with the collection of scale samples and statistical data relating to the landings of sprat at different west coast ports.

Samples of **herring** were collected and analysed.

The stocks of young **flat fish,** primarily plaice, flounder and turbot along the west and south coasts of Sweden, were investigated on the same lines as in preceding years.

Statistical material relating to the landings of plaice, witch and haddock was collected at Gothenburg.

The working up of statistical material relating to the landings of **haddock,** and **witch** at Gothenburg and other west coast ports was completed during the year.

The working up of otolith material from **ling** was continued and supplemented by data relating to the size and location of the fishery in 1947.

During the winter of 1947 investigations were made into the large-scale occurrence of *Meganyctiphanes norvegica* and the food resources of the herring.

Size of Mesh.

Fishing experiments were carried out with trawls fitted with different sized mesh.

Plankton Investigations.

1) Observations on planktonic fish eggs (sprat eggs in particular) in the outer archipelago off Lysekil and in the so-called Uddevalla fjords, primarily for the purpose of ascertaining to what extent stormy weather affects their mortality.

2) Investigations in the Kattegat during the autumn into the vertical distribution of the newly-hatched herring larvae during the different hours of the day and night and into the food of the herring larvae.

Publications.

Andersson, K. A.: "The Stock of Herring in the Skagerak and the Kattegat during 1941—1945". Annales Biol., Vol. II.

— "The Stock of Herring in the Sound and the Southern Baltic in the years 1940—1944". Ibidem.

Höglund, Hans: "Foraminifera in the Gullmar Fjord and the Skagerak". Zoologiska Bidrag från Uppsala. Band 26.

Molander, Arvid R.: "Observations on the Growth of the Plaice and on the Formation of Annual Rings in its Otoliths". Sv. Hydr. Biol. Komm:s Skrifter, N. S., Biologi II, No. 8.

— "The Swedish Witch Fishery in the Light of Statistical Data". Ibidem, No. 9.

— "The Haddock Fishery off the West Coast of Sweden 1935—1939 and 1940—1944". Annales Biol., Vol. II.

— "Hydrographical Conditions off the Bohuslän Coast during the Years 1939—43". Ibidem.

— "The Growth of the Sprat of the West Coast of Sweden during the Cold Winters 1940—1942 and some Notes on the Great Coastal Fishery for Sprat during February—March 1943". Ibidem.

BALTIC AREA COMMITTEE

1947

By

Chr. Hessle.

Reports of work carried out during the year 1947 have been received from Denmark, Finland, Poland and Sweden.

Denmark.

Biology (Aage J. C. Jensen).

Plaice, Flounder, Turbot. Quantitative fishing experiments with the Johansen young-plaice trawl were carried out from the M/S "Havkatten" off the coast of Møen and Seeland from July 16th to July 17th. Quantitative hauls with the hand shove-net were carried out on the coast of Bornholm from September 10th to September 17th, for the determination of the number of the 0-group (and I-group) of plaice, flounder and turbot.

Herring. Samples of herring from Bornholm have been analysed as to race, age etc.

Plankton.

Samples of plankton were collected off the coast of Bornholm in September. Determinations of the fat content of plankton were made.

Hydrography.

Hydrographical observations have been carried out off the coast of Bornholm in September.

Finland.

Biology (T. H. Järvi).

Herring. Investigations on herring have been started in the Gulf of Bothnia (in the archipelago of Uusikaupunki—Nystad).

Seals. Statistics of killed seals have been collected.

Hydrography (G. Granqvist, R. Jurva).

(See the report of the Hydrographical Committee.)

Poland.

Biology (M. Bogucki).

Cod. The collection of material for the study of the annual cycle of life was continued. Market measurements of cod landed in Gdynia were carried out.

Flounder. Analysis of the stock of flounder was made with reference to the age, maturity etc.

Herring. Samples of herring were collected for racial investigations.

Plankton.

Monthly plankton samples were collected from various depths in the Gulf of Gdańsk.

Hydrography.

Observations concerning temperature, salinity, O_2 and P content at different depths were carried out in the Gulf of Gdańsk every month contemporaneously with the collecting of plankton samples. Daily observations of the surface temperature and salinity were made by the State Meteorological Institute at two coastal stations (Gdynia, Leba).

Publications.

I. Biernacka: "Tintinnoidea of the Gulf of Gdańsk and adjacent waters." Bull. Stat. Marit. de Gdynia. 4.

W. Mańkowski: "The quantitative distribution of eggs and larvae of *Clupea sprattus* L., *Gadus morrhua* L. and *Onos cimbrius* L. in the Gulf of Gdańsk in 1938, 1946 and 1947." Journ. du Cons., XV, 3.

Z. Mulicki: "Changes in the composition of the Flounder stock in the Gulf of Gdańsk during the war." Ann. Biol., IV.

Sweden.

The M/S "Eystrasalt" was kept in commission from May to December and the cruises were extended from the Sound to the northern part of the Baltic area. The research vessel "Skagerak" made a cruise to the southern Baltic in September.

Biology (Harald Alander).

Cod. The stock of cod was investigated and many fishing experiments were made in different parts throughout the whole area. Samples were collected and analysed as to length, age and maturity. The distribution of eggs and larvae was investigated.

Plaice, Flounder and Turbot. Quantitative fishing experiments with the Johansen young-plaice trawl

were made in shallow water off the coast of Scania and Blekinge in September. The stock of flat-fish was investigated in the Bornholm area and in the central Baltic.

Herring. A great many fishing experiments were made in order to study the stock of herring and its changes inside the Swedish archipelagoes, off the coast and in the open sea. Samples from all parts of the area were collected and analysed as to race, age and spawning periods.

Sprat. The stock of sprat in the Bornholm area and in the archipelago of the central Baltic was investigated.

Eel. Marking experiments with eel were carried out in the southern part of Kalmar Sound and in Blekinge. About 400 eels were tagged.

Plankton.

Many quantitative samples of plankton were collected with the Hensen net from different parts of the whole area.

Hydrography.

In connection with the biological investigations a great number of hydrographic observations (temperature, salinity, oxygen content and hydrogen-ion concentration) have been made.

Aids to Fishing.

The M/S "Eystrasalt" has been commissioned for locating shoals of herring with the echo-sounder in different parts of the area.

Rational Fishing.

Experiments on the effect of different sizes of mesh on the catch of fish were carried out in the Bornholm area.

Reports of other Committees.

HYDROGRAPHICAL COMMITTEE

1947

By

HELGE THOMSEN

Belgium (H. KOCH).

No hydrographic work has been carried out during the past year.

Denmark (HELGE THOMSEN).

Cruises.

During the cruise of the R/V "Dana" in the North Sea and the Northern Atlantic, from May 3rd to August 15th, hydrographic investigations were carried out at 261 stations. The investigations comprised observations of temperature and salinity at all stations and, at selected stations, also determinations of oxygen, phosphate and nitrate. In the North Sea, the work alotted to Denmark at the Göteborg meeting in February 1947, was carried out according to the programme, namely 56 stations from May 5th to 8th and 63 stations from May 19th to 22nd. Other areas investigated were the Rockall Bank, Faroe waters and an area west of the Faroes as far as 51° N., 44° W. The Faroe-Shetland section was run on July 19th. In the North Sea, investigations were carried out again during the end of July and the beginning of August.

The three permanent sections off the west coast of Greenland were run by Naval Ships as follows:

Fylla Bank: June, August
Lille Hellefiskebank: August
Store Hellefiskebank: August.

A new permanent section off Frederikshaab was established. The section comprises 4 stations:

61°57′ N.—50°00′ W.
61°52′ N.—50°35′ W.
61°47′ N.—51°09′ W.
61°41′ N.—51°45′ W.

This section was run for the first time in August.

Other hydrographic investigations in the coastal waters off West Greenland were carried out from the M/C "Adolf Jensen".

Observations from Liners.

Surface samples were collected from liners on the routes Copenhagen—Greenland and Copenhagen—Iceland.

Observations from Light Vessels and Coastal Stations.

Regular hydrographic observations have been made by the Danish Meteorological Institute as follows:

1) daily observations of temperature and salinity from 12 (11) light vessels and 17 (16) coastal stations.
2) 4-hourly estimations of the surface current from 12 (11) light vessels.

The light vessel "71 SW" on 56°58·7′ N.—7°40·0′ E. was withdrawn on October 22nd.

Éire (A. E. J. WENT).

Owing to the absence of a research vessel no work at sea was carried out during 1947. Surface temperatures at the Coningbeg Lightship were, however, recorded during the year.

England (J. R. LUMBY).

Fisheries Laboratory, Lowestoft.

1. **Research Ships.** Routine observations on the Flamborough line were carried out monthly for the whole of 1947. The Smith's Knoll—Haaks line of observations was carried out during May, June, July, September, November, and December; this line has now been discontinued. Observations of salinity and temperature were made in the southern North Sea during January, February, March, and December in connection with plaice-egg investigations and studies of the effect of the exceptionally cold weather. In September, a hydrographic section was run on the line Tyne—Lindesnes. In October, observations of salinity, temperature, and oxygen were taken on the

English herring fishery grounds in connection with investigations on the phytoplankton patches.

2. **Commercial and Light Vessels.** During the year, routine observations of surface salinity and temperature were started on the Folkestone—Boulogne, Southampton—Jersey, Land's End—Ushant lines, and the Seven Stones light vessel. Other lines, started in 1946 and listed in the Report of the Hydrographical Committee for 1946, continued observations throughout the year.

3. **Ocean Weather Ships.** In November, surface observations of salinity and temperature were started from two of the four British Weather Ships, operating at stations "I" and "J".

Marine Biological Association, Plymouth.

1. The monthly cruises to International Hydrographic Station E1 (50°02′ N., 04°22′ W.) have been continued. A more extensive survey of the English Channel was undertaken in January, 1947. On that survey salinity, temperature, and inorganic phosphate were determined at 23 stations between 48° and 50° N. and 4° and 8° W. Hauls with the young-fish trawl were taken at every hydrographical station in order to provide data on biological indicators of water movements. Total and reducible iron, silicate, and total phosphate were determined at certain stations only.

Department of Oceanography, Liverpool University.

1. The survey of the temperature and salinity of the waters of the Irish Sea, which was started in 1934, was continued, observations and samples being taken three times per week at each of eight stations. An investigation of the heat interchanges of the central part of the Irish Sea, based on the observations of this survey, has been carried out.

2. In collaboration with the Liverpool University and Tidal Institute, observations of oscillating currents and pressures had been taken from the Queen's Fort in Liverpool Bay during two periods in 1946. These observations have been analysed and the results published in the Proceedings of the Royal Society.

Finland (G. Granqvist).

In 1947 the hydrographico-chemical work of Thalassological Institute in Finland has been confined to the coastal waters only, as larger hydrographic expeditions could not be carried out. Hydrographic material from 21 fixed stations, 8 lightships, 12 tidal gauge stations, 13 tidal pole stations and 70 ice stations has been collected at the same times as before. This material has not yet been published.

France.

I. Mer du Nord (Observateur M. Ancelin).

Températures et prélèvements d'eau:

20—28 Avril 1947 — sur le Dogger Bank et le Great Fisher Bank à bord d'un chalutier.

28—30 Janvier — sur les bancs des Flandres pendant la saison de pêche du hareng.

Quelques stations hydrologiques ont été également effectuées à bord de l'Escorteur "Spahi" de la Marine Nationale.

II. Entrée occidentale de la Manche et Mer Celtique (Observateurs: MM. Letaconnoux, Forest et Ancellin).

25 Mars—8 Avril — Températures et prélèvements d'eau sur le "Cockburn", la "Petite Sole" et le Golfe 47° N. au 50° N.

Quelques stations hydrologiques effectuées par l'Escorteur "Spahi".

III. Golfe de Gascogne Observateurs: MM. Forest et Ancellin).

Températures et prélèvements d'eau:

10—16 Juin — Quelques stations hydrologiques entre le 46° et le 48° Nord par l'Escorteur "Grenadier".

25 Août—30 Septembre — Observations hydrologiques sur les pêcheries de germon 47° à 50° Nord à bord du thonier "Berceuse".

IV. Méditerranée (Observateurs: MM. Faure et Morice).

2—13 Avril — 3 stations hydrologiques au large de Banyuls.

19—30 Août — 13 stations hydrologiques à bord du "Chasseur 142" dans le Golfe du Lion.

29 Décembre — 2 stations hydrologiques au large de Banyuls.

V. Terre-Neuve.

Une soixantaine de stations hydrologiques ont été faites sur les bancs de Terre-Neuve par la Frégate "Aventure" qui a procédé, au cours de ses déplacements, à des observations de températures superficielles.

Quelques relevés systématiques de températures superficielles ont été exécutés par certains bâtiments de la Marine Nationale au cours de leur sorties. Les observations faites et le matériel recueilli sont en cours d'étude.

Holland (H. Keyser).

Surface and bottom temperature and salinity observations in the waddensea were made during May, June, September, and October 1947.

Surface temperature and salinity observations along the coast between Ijmuiden and Jade were made during October 1947.

Current observations with the vertical-log were made on board light vessels "Goeree" (whole year) and "Texel" (from March 1947).

Norway (J. Eggvin).

1. The Cruises. During 1947 11 cruises were carried out with the Fisheries Directorate's research cutter "Johan Hjort" and 5 hired vessels. The fields of operation were the Norwegian coastal waters, Svalbard waters, Icelandic waters, the Skagerak and the northern North Sea. The numbers of observations

were as follows: At 498 stations 4500 observations on temperature and salinity and 1809 analyses of pH and the content of oxygen and P_2O_5 together were made.

2. Permanent Stations. At the 8 permanent oceanographical stations off the Norwegian coast observations on temperature with collection of samples for salinity were made regularly during the whole year at standard depths between 1 and 300 m. The stations were worked once a week from December to April, once every second day in May and once every second week during June to November.

3. The Sea-Surface Thermograph Service. Thermograph records were obtained from 6 liners running on the following routes from Bergen:

1. To Newcastle, 2. to Rotterdam, 3. to Oslo, and 4. to Kirkenes (East Finnmark).

Poland (M. Bogucki).

Baltic.

Observations concerning temperature, salinity, O_2 and P content, at different depths, were carried out in the Gulf of Gdańsk every month, contemporaneously with the collecting of plankton samples. Daily observations of the surface temperature and salinity were made by the State Meteorological Institute at two coastal stations (Gdynia, Leba).

Scotland (John B. Tait).

During 1947, hydrographical in conjunction with biological work was carried out by the Scottish research vessel "Explorer", in the North Sea between latitudes 54°30′ N. and 61°01′ N., in all months from April to December inclusive. In addition, the Faroe—Shetland Channel was traversed in June and August, and west Scottish coast waters also in the latter month.

Surface to bottom temperature and salinity data were taken at 274 stations, involving a total of over 2,000 temperature observations and a like number of salinities. In course of the year also, 2,085 surface drift-bottles were liberated, for the most part in groups of ten, at selected positions on all cruises except that of December. To the end of the year, 368 of these drifters had been recovered, mostly on the Norwegian coast from about the latitude of Bergen northward, but in significant numbers also within the Skagerak and on British shores.

The broad results of the year's work are reported in *Annales Biologiques*, Vol. IV.

Sweden (Hans Pettersson).

Salinity and Temperature. Daily hydrographic observations were carried out at Bornö Station (depth 34 m.) and from the lightships "Vinga" (40 m.) and "Fladen" (40 m.). In the Baltic observations were made three times a month from five lightships: "Ölandsrev", "Svenska Björn", "Grundkallen" "Finngrundet", "Sydostbrotten".

From May 5th to 29th the "Skagerak" took part in the joint Scandinavian investigations in the North Sea. Part of the programme was repeated during a short cruise in October.

The study of the variations in salinity, temperature and other factors of hygienic importance in the water system outside the harbour of Stockholm, begun in 1945 at the instigation of the "Stockholms Gatukontor", and led by Dr. Börje Kullenberg, were continued and completed. A similar investigation of the factors governing the mixing of sea water and river water at the mouth of the "Göta Älv", which had been started in 1946 at the request of the Board of Health and the Harbour Authorities of Göteborg, was continued during 1947.

Measurements of the transparency of the water of the Gullmar Fiord at different depths using the transparency meter designed by Dr. Niels G. Jerlov (Johnson) were continued throughout the year.

Other Investigations.

Dr. Jerlov and Dr. T. Levring continued and completed an investigation on the production of vitamin D in the sea.

Dr. Levring likewise completed and published an investigation, begun in 1945, on submarine daylight and the photosynthesis of marine algae.

A study was made by Dr. F. Gross, Edinburgh, of the photosynthesis of cultures of various planktonic organisms (diatoms and Flagellatae) suspended in bottles at various depths in the plankton-shaft of the Oceanographical Institute, Göteborg.

Spain (Fernando Balén).

Instituto Hidrografico de la Marina, Seccion Hidrografica in collaboration with Instituto Español de Oceanografia.

Off the east coast of Africa, between the parallels 26° and 28° Lat. North, measurements of temperature and collection of water samples were carried out in connection with sounding work from the "Malaspina".

Observations of the surface current during 25-hour periods were carried out at 5 localities off the coast of Spanish Morocco from the ships "Tofiño" and "Artabro".

Tidal observations for computing the harmonic constants were carried out at two localities off Gran Canaria, at one on the coast of Spanish Morocco, at one on the coast of Spanish Sahara and at one on the coast of Spanish Guinea.

PLANKTON COMMITTEE

1947

By

F. S. Russell

Denmark (P. Jespersen).

1. The collection of herring stomachs from the waters round Bornholm has been continued as long as the herring fishery lasted. The contents of the stomachs have been analysed.

2. From May to August 1947 the research ship "Dana" made a cruise in the North Sea and across the North Atlantic as far as about 50° N. Lat., 45° W. Long., north to South Greenland and east to the Faroes. On the whole trip zooplankton was collected with the Hensen net (50—0 m.) and phytoplankton collected by nets and water samples.

3. The working up of the material of deep-sea copepods from North Atlantic waters has been continued.

4. A report on the zooplankton in the Isefjord in the northern part of Seeland, based on investigations carried out during the years 1940—43, is under preparation.

5. The examination of phytoplankton collected during the cruise of "Dana" in North Atlantic waters in August-September 1946 has been continued.

6. The collection of plankton samples in parts of Præstø Bay (SE. Seeland), commenced in March 1946, was discontinued in autumn 1947. The examination of the material has been continued.

7. A paper on the phytoplankton in the coastal waters at the south-western part of Jutland ("Vadehavet") has been prepared for publication.

8. The examination of previous collections of bottom-diatoms from the estuaries near Esbjerg has been continued.

9. A manuscript of the late Professor Ove Paulsen on the systematics of some North Atlantic Dinoflagellates has been revised and the paper is ready for printing.

10. Preparations are made for collecting weekly plankton samples from a light-ship (Halskov Rev) in Great Belt.

Publication:

Gunnar Thorson: "Reproduction and larval development of Danish Marine Bottom Invertebrates, with special reference to the Planktonic Larvae in the Sound (Øresund)." Medd. Komm. Danmarks Fiskeri og Havundersøgelser, Ser. Plankton, Vol. IV, 1. 1946.

Éire (A. E. J. Went).

No plankton work was carried out during 1947.

England.

Hull (C. E. Lucas).

The Continuous Plankton Recorder Survey of the North Sea and North-Eastern Atlantic was continued and developed during the year, a total of some 22,000 miles being analysed. Plankton records have been obtained over the routes initiated during 1946 as follows:

Hull—Copenhagen	(11	records)	3527 miles
Hull—Rotterdam	(29	—)	2225 —
Hull—Hamburg	(7	—)	1262 —
Leith—Copenhagen	(11	—)	4335 —
Leith—Lerwick	(20	—)	3413 —
Pentland—Iceland	(8	—)	2790 —

During 1947 additional routes have been added: (1) between Leith, Kirkwall and Lerwick in August (371 miles); (2) between Newcastle and Copenhagen in November (543 miles); (3) between London and Stockholm in November (767 miles); and (4) between the north-west coast of Scotland and the southern of the two British Weather Ship Stations (P.I.C.A.O. Service) in November (804 miles); in addition various non-recurrent records have been obtained in the North Sea, totalling 2047 miles. In January 1948 recording began between Scotland and the northern of the two Weather Ship Stations, so that records should now be obtained regularly on three lines across the Atlantic

approaches to the North Sea. It is hop d to extend the survey further during 1948.

Although it has not yet been possible to re-establish all the pre-war North Sea routes, those available have provided a useful survey of the North Sea plankton at 10 metres depth in 1946—47, and they suggest a number of unusual features. In the southern North Sea some of these invite a comparison between conditions in 1946 and/or 1947 and 1932—34 and, particula ly in the winter, with 1932—33.

In addition to the recorder survey, a preliminary plankton survey of the Scottish east coast herring fishery was initiated from Fraserburgh, using a smaller form of Professor HARDY's Plankton Indicator. For the period under survey (June—August) the plankton-herring correlations were substantially similar, particularly in their positive and negative variations, to those obtained during 1930—35 in Scottish waters and off Shields. It is intended that the survey shall be resumed and extended during 1948 in order to study the herring movements relative to the plankton in further detail.

The following reports have been published from the Department during the year:

HARDY, A. C. & PATON, W. N., 1947: "Experiments on the Vertical Migration of Plankton Animals." Journ. Mar. Biol. Assoc., 26, pp. 467—526.

LUCAS, C. E., 1947: "The Ecological Effects of External Metabolites." Biol. Rev. 22, pp. 270—295.

RAE, K. M. & REES, C. B., 1947: "Continuous Plankton Records: The Copepoda in the North Sea, 1938—39." Hull. Bull. Mar. Ecol., II, No. 11, pp. 95—132.

Lowestoft (R. S. WIMPENNY).

The regular Hensen and fine international net stations of the Flamborough Line were visited each month in 1947 and were augmented for comparative purposes by a line of seven stations in the Southern Bight between the Smith's Knoll and Haaks Light-vessels. It was found that the crop of plankton was heavier on the Flamborough Line.

The phytoplankton of the Flamborough Line was characterised by a short sharp outburst in the spring. The numbers present in the second half of 1947 were greater than for the same period of 1946. 1947 was also superior to 1946 in respect of nauplii and for the fat content and dry weight of the Hensen-net plankton.

For zooplankton the Hensen-net catches of the Flamborough Line gave a June maximum greater than those of 1938 and 1939 and approaching 1937. The September maximum, however, appears to have remained similar throughout the years 1938, 1939, 1946 and 1947.

Plankton cruises consisting of three lines of stations off the east coast of England, and similar to those of pre-war years, were made in June and October. The fat content and dry weight of the Hensen samples was determined and it is of interest to report that the highest fat content obtained since these cruises began occurred at the northern end of the June cruise. An unusual incursion of doliolids, indicators of Atlantic water, was found at the northern stations of the October cruise.

At the time of the East Anglian herring fishery cruises were made by the research ships and samples were also collected by the Fishery Patrol. Direct reporting of patches of "weedy water" caused by phytoplankton and likely to interfere with the herring was made to the herring drifters. A patch of *Rhizosolenia styliformis* was found over the Norfolk Banks in the early part of the fishery, but there was no serious hindrance to the fishery attributable to this cause. The observations made in late November suggested that *Rhizosolenia styliformis* reached its maximum development later in the year than usual.

A survey of the plaice-egg spawning ground of the Southern Bight for the season 1946—1947 was completed by March and the plankton and plaice-eggs were counted during the year. The estimated plaice-egg production for the season was 4,700,000,000,000.

Plymouth (F. S. RUSSELL).

Dr. H. W. HARVEY has developed a photoelectric instrument for estimating the dissolved organic phosphorous in sea water and phosphate in solution, (published in Journ. Mar. Biol. Assoc., Vol. XXVII No. 2). Data are being obtained from different areas at different times of the year to find whether these are related to the potential fertility of water masses as shown by winter maximum of phosphate and contemporary plankton content. Experiments have also been made on the rate of phosphate excretion by two species of animals filter-feeding on varied concentrations of phytoplankton.

Observations on the occurrence of zooplankton indicator species and young fish in the western end of the English Channel have been continued by Mr. P. G. CORBIN, who has also investigated the postlarval stages of the different species of *Ammodytes* occurring in the plankton.

A study has been made by Mr. P. S. B. DIGBY of the biology of the smaller plankton copepods such as *Pseudocalanus*, *Temora*, *Acartia* and *Oithona*. The development of successive generations throughout a year has been followed together with observations on growth.

Mr. D. P. WILSON has published in Vol. XXVII, No. 1 of the *Journal of the Marine Biological Association* an account of the occurrence of the Siphonophore, *Physalia*, off the south-west coasts of the British Isles in 1945; all records of the occurrence of this species in past years have been collected together in this report. He has also worked out the development of the planktonic larva of the polychaete worm, *Ophelia bicornis*.

France.

Algéria (F. BERNARD).

La Station maritime de l'Université d'Alger a continué en 1947 des sorties regulières en Méditer-

ranée, jusqu'à 6 milles des côtes, par fond de 1550 mètres. Au cours de ces opérations, des prises d'eau ont été faites à 10, 50, 100, 200, 400, 500 et 750 mètres. Les éléments étudiés ont été: température, salinité, oxygène, phosphates, nitrates. Le nanoplancton à été conté au microscope inversé.

Un examen plus détaillé des Flagellés calcaires a été fait sur des prises d'eau de 50 litres: ce groupe représente plus de 80 % du volume de nanoplancton par litre, et la fertilité maximum est entre 50 et 200 mètres. Grâce au Dr. P. Jespersen, de passage à Alger comme Professeur d'Actualités scientifiques à l'Université, nous avons commencé des recherches sur la quantité de macroplancton, par filets fermants, de 0 à 500 mètres.

A la Station de Castiglione, le Dr. Dieuzeide a continué ses observations sur la biologie des sardines, sardinelles, bonites, etc.

Les résultats font l'objet de notes en cours de publication au *Journal du Conseil* et au *Bulletin de la Société d'Histoire naturelle d'Afrique du Nord*. Quatre chercheurs contribuent à ces études, et la région intéressante de Tanger (Maroc) commence à être explorée avec les mêmes techniques par M. Trottet.

Finland (T. H. Järvi).

Publication:

L. M. Levander and K. J. Purasjoki: "Plankton gesammelt in den Jahren 1899—1910 an den Küsten Finnlands." Finnländische Hydrogr.-biolog. Untersuchungen, No. 11.

Holland (B. Havinga).

It was not possible to carry out any work on plankton during 1947.

Norway.

Bergen (Kr. F. Wiborg).

During the spring zooplankton was collected in the Lofoten area in northern Norway. A comparison was made in the catching power of the Nansen net, the Clarke-Bumpus plankton sampler, and a plankton pump. (A report on the results has been published in 1948.)

During the summer horizontal hauls at different depths were made with a 1-metre net along the south-western coast of Norway in order to investigate the propagation of mackerel and sprat.

In the early winter zooplankton was collected in the coastal area of northern Norway.

Zooplankton material collected in previous years is continually being catalogued and worked up. (A report on the occurrence of cod larvae and their food organisms has been published in 1948.)

Oslo (T. Braarud).

The working up of phytoplankton material collected in the preceding years at the permanent oceanographic stations along the coast and in the Oslo Fjord has been continued. Some additional material on the hydrography, the phyto- and zooplankton conditions in the Oslo Fjord was also collected.

Poland (M. Bogucki).

All plankton work has been limited to the Baltic; see the report of the Baltic Area Committee.

Scotland.

Aberdeen (R. S. Clark).

The report on the plankton work by the Scottish Fishery Board is given in the Northern North Sea Report.

Millport (Sheina M. Marshall).

During the spring increase of 1947, Loch Striven in the Firth of Clyde was visited twice weekly from March 7th to April 18th.

Hauls for zooplankton were taken with an international closing net and with a small centrifugal pump with rubber hose. Samples were taken from 60 m. to the surface. Samples for chemical analysis and for microplankton were taken by waterbottle, and the temperature, salinity, pH, oxygen, soluble phosphate, nitrate, nitrite and ammonia were estimated.

The spring diatom increase had already begun on March 7th which was unexpectedly early considering the very cold weather. On the first few visits the water was mixed from top to bottom and diatoms were rich from surface to bottom also. In April the Loch became more stable and diatoms increased at the surface again. The whole increase was over by April 15th.

The zooplankton was decidedly sparse during March except for lamellibranch larvae, which far out-numbered anything but *Temora* nauplii. Numbers increased in April especially at the time of, and after, the second diatom increase. Large numbers of rotifers were present at times especially in the surface layers. Among copepods *Temora* was most abundant with *Pseudocalanus* in the second place.

When catches from pump and international net were compared, assuming that the net is filtering with complete efficiency and allowing for the different quantity of water filtered, the pump was found to catch more zooplankton but less phytoplankton.

Plankton hauls from Keppel Pier, Millport, were made every third day during January; daily during February, March and April; every third day from May to October (inclusive) and every fourth day during November and December.

Counts are made of the numbers of Cirripede larvae present in each haul and records kept of the general abundance of other planktonic forms. Examination of the hauls made is complete up to the middle of June.

Nets were fished for an hour on each occasion,

from one hour after high water until two hours after high water. At least one fine net (150 meshes to the inch) and one medium net (50 meshes to the inch) was used each time.

Some Cirripede records (up to the end of April) have been incorporated in a paper by K. A. Pyefinch published in the *Journal of the Marine Biological Association*, Vol. XXVII, No. 2.

Spain (M. Massuti).

During 1946 weekly samples of plankton have been examined from the port of Mahon in Minorca. At the same time the stomach contents of six specimens of sardines from the same place were examined each week. A seasonal record of the phytoplankton and zooplankton has been obtained. The predominant organisms in the sardines stomachs were Prorocentridae, Tintinnidae, Cladocera and Copepoda.

Sweden (Hans Höglund).

The Swedish plankton work has consisted in:

1. further experiments dealing with the presumed mortality of pelagic fish eggs due to rough weather, and

2. investigations into the diurnal vertical distribution of autumn-spent herring larvae in the Kattegat and in connection herewith examinations of the food content of the larvae.

SALMON AND TROUT COMMITTEE

1947

By

KNUT DAHL

THE manufacture of tags for 1948 has been progressing well and it is hoped that the demands for the season can be met. Mr. LEA has now moved to Oslo, address: Biol. Laboratory, Frederiksgate 3, Oslo. In ordering tags care should be taken, if possible, not to order larger quantities than are needed for one season.

Reports are due from the following countries: Belgium, Denmark, Éire, England and Wales, Finland, France, Holland, Iceland, Norway, Poland, Scotland, Spain, Sweden.

Belgium.

No report.

Denmark (C. V. OTTERSTRØM).

1. Biological Investigations.

The biological examination of the salmon and trout rivers has been continued. Experiments have also been continued dealing with the liberation of salmon fry into the affluents of the Gudenaa where the original stock is extinct; electro fishing over certain distances has shown that the fry is doing well (a report is in the press). An examination has been started on those maiden sea trout which enter the lower part of certain rivers for wintering, and on young trout, with special reference to the season at which they migrate and their age and length at that time. An investigation into the trout stocks of the Faroes has been started. The grayling stock is being examined.

2. Artificial Propagation.

Hatchery operations were carried out at a number of centres, and fry and half-yearlings, especially of sea trout, have been liberated in rivers with free access to and from the sea. A fishway with pools and submerged orifices has been erected at the power house of Karlsgaarde (height of fall, 10—11 m.) on the river Vardeaa, and is working satisfactorily. A minor modified Denil fishway has been built near the Haraldskær works on the river Vejleaa.

3. Statistics.

As in former years statistical data on the individual weights of sea trout (and salmon) have been collected in the Randers Fjord (estuary of the river Gudenaa), and samples of scales of sea trout have been taken in the same area.

4. Publications.

C. V. OTTERSTRØM: "Modstrømstrappen — en ny Fisketrappetype." Ferskvandsfiskeribl., 1946, No. 9.

— "Fisketrappen ved Karlsgaarde Kraftstation." Ferskvandsfiskeribl., 1947, No. 1.

— and KNUD LARSEN: "Extensive Mortality in Trout caused by the Infusorian *Stentor polymorphus* Ehrenb." Rep. Dan. Biolog. Stat., XLVIII, 1943—45, Copenhagen, 1946.

KNUD LARSEN and C. J. RASMUSSEN: Investigations on the Grayling (*Thymallus thymallus* L.) in Denmark. Skive 1947.

Éire (A. WENT).

1. Biological Investigations.

During the period under review investigations into the age and growth of salmon of the rivers Inny, Drumcliffe, Owenea and Shannon were carried on and reports on the Inny and Drumcliffe rivers were accepted for publication. A small collection of material relating to sea trout from the Owengowla was also investigated. In addition material relating to the stocks of salmon in a large number of Irish rivers collected during 1946 was investigated but at the close of the year this investigation has not been completed.

2. Artificial Propagation of Salmon and Trout.

Hatchery operations were carried out at a number of centres during the year and the output as far as can be ascertained at present was somewhat in excess of that of the previous year when the abnormal floods prevented the capture of breeding fish.

3. The Catch of Salmon.

The returns of catches demanded from every holder in 1945 of a licence to fish for salmon were compiled. The catch of salmon amounted in that year to 460,000 kg. which was probably the smallest catch recorded in this country for a period of at least 50 years. The comparable returns for 1946 indicated that the catch was 740,000 kg itself considerably

below average for the past 20 years. The returns for the year 1947 are now in course of compilation and will not be available for some time. The export figures published monthly by the Department of Industry and Commerce did, however, give some idea of the relative abundance of salmon. In 1947 560,000 kg. of salmon were exported mainly to Great Britain. This amount was only slightly in excess of that of the previous year but owing to the prolonged period of cold weather and the subsequent floods fishing operations in the first three to three and a half months of the year were adversely affected. Spring fish seems to have been comparatively scarce, particularly during the early part of the season but there was some improvement when the summer fish commenced to run. Drift-net fishing off the north and north-west coasts gave somewhat improved results during the year when compared with 1946. This fishing depends almost entirely upon the runs of grilse.

4. Papers published.

ARTHUR E. J. WENT, 1947: "Salmon of the Kerry Blackwater." Sci. Proc. R. Dublin Soc.
— 1947: "Irish Salmon, 1945." Sci. Proc. R. Dublin Soc.
— 1947: "Salmon Marking in Ireland." Proc. Roy. Irish Acad.

Copies of these papers have already been circulated to members of the Committee.

5. History of Irish Fisheries.

During 1947 investigations into the history of the fishing weirs on a number of Irish rivers were carried out. This survey, which was not quite completed at the end of the year, will eventually be incorporated in a paper to be submitted to one of the Irish learned societies.

England and Wales (F. T. K. PENTELOW).

During 1947 a station at Whitby was established for tagging salmon in the sea in accordance with the decision of the Committee at Stockholm in 1946. 57 salmon and 9 sea trout were tagged during the months from May to August. 13 tagged fish and two unattached tags have been returned.

In November 157 spawning fish and kelts were tagged in a tributary of the river Dee in Wales.

Finland (T. H. JÄRVI).

The yield of the salmon fishery in 1947 was declining. Material for scale analysis was collected in the Oulu River. 208,400 salmon fry and 7,335 one-summer-old parr were liberated in the Oulu River.

France (R. VIBERT).

1. Recherches biologiques.

Les travaux sur la physiologie et la biochimie du saumon entrepris dans le bassin de l'Adour depuis 1945 par M. le Professeur M. FONTAINE sont poursuivis, de même les travaux entrepris sur la croissance et l'âge des saumons par M. R. VIBERT. La publication de ces travaux est à envisager pour 1949.

2. Propagation artificielle du Saumon.

Récolte d'œufs très faible pendant l'hiver 1946—1947, comme le stock de saumons de l'année 1946.

Les déversements d'alevins de saumons exécutés en 1947 ont donc été de peu d'importance:

50,000 pour le bassin de l'Adour, 50,000 pour le bassin de la Loire; Néant pour les fleuves côtiers bretons, 100,000 pour les fleuves côtiers normands, plus 2,000 sommerling.

A noter l'envoi par la Norvège de 70,000 œufs de saumons qui ont donné 30,000 alevins déversés à 3 mois dans la Risle (compris dans les 100,000 ci-dessus) dans les meilleures conditions, pour y tenter une réacclimatation. En même temps de nouvelles "Passes à Saumons" sont construites sur cette rivière.

3. Prises de Saumons.

Année 1947 mauvaise pour toutes les rivières. En outre dans le haut Allier, zone des frayères du bassin du fleuve Loire, presque tous les saumons ont péri pendant l'été 1947 du fait de la chaleur (température de l'eau 28° C.).

4. Études publiées ou sous presse.

M. FONTAINE, 1947: "La physiologie du Saumon, Ière Partie." (Communication au Congrès de l'Association Française pour l'Avancement des Sciences — Biarritz — Septembre 1947.) Ann. Stat. Centr. Hydrobiol. Appliquée, II, 1948.
FONTAINE et OLIVEREAU, 1947: "La glande thyroïde du Saumon atlantique (*Salmo salar*) ♀ au cours de sa vie en eau douce." C. R. Acad. Sci., 224, p. 1660.
FONTAINE et VIBERT, 1948: "Sur le cycle pédogénétique du Saumon *(Salmo salar)*." (Communication au XIII Congrès International de Zoologie — Paris — Juillet 1948.)
R. VIBERT, 1947: "Aperçu sur la biologie du Saumon atlantique." (Communication au Congrès de l'Association Française pour l'Avancement des Sciences — Biarritz — Septembre 1947.) Ann. Stat. Centr. Hydrobiol. Appliquée, II, 1948.
— 1947: "Dommages piscicoles des usines hydroélectriques — Evaluation et Limitation." (Communication au Congrès de l'Association Française pour l'Avancement des Sciences — Biarritz — Septembre 1947.) Bull. Franç. Piscicult., No. 148, Janvier—Mars, 1948.

Holland (G. J. LIENESCH).

No investigations have been carried out for the Salmon and Trout Committee in 1947.

Contact has been renewed with Switzerland and France for the revival of the Salmon Agreement for the river Rhine.

The salmon catches of 1947 were poor. The small capacity of drift-nets gives a wrong idea of the available stock and the poor catches caused a decrease in fishing intensity.

The Allied Control Authorities in Germany are now also interested in the reconstruction of the salmon

fisheries, in combination with investigations for the protection of the quality of the Rhine waters.

Iceland (Thor Gudjohnson).

1. Biological Work.

Some 650 samples of salmon scales were collected for growth studies and age determination. These came mainly from salmon caught in the tributaries of the rivers Ölfusá—Hvitá and Hvitá in south-west Iceland. These two rivers and their tributaries support about two thirds of the salmon fishing in Iceland. The rest of the scale samples were obtained from the same rivers as last year. A few samples of scales of sea trout were also collected.

Iceland had agreed to participate in the International Tagging Experiment by tagging smolts, kelts and, if possible, clean salmon. Preparations were made for tagging smolts and kelts, but the tags that had been ordered were not received, so the marking of smolts by cutting fins (the left ventral and the adipose) was resorted to. 401 smolts were caught and marked in the river Korpólfsstaðaá, a few kilometres east of Reykjavik. No kelts were tagged. It proved impossible to raise funds to cover the expenses of catching clean salmon. The fact that there is no fishing for salmon in the sea round Iceland makes the securing of fishing gear and its operation rather expensive.

The condition of the river Laxá in the district of Þingeyjarsýsla was studied with a view to the possibility of it supporting salmon.

2. Artificial Propagation.

Hatchery operations were carried out at four centres. Heavy rainfall during the autumn caused great difficulties in securing salmon and trout for stripping purposes. Several centres were not operated because yields were too low.

3. Statistics.

Complete returns of the catches of salmon and trout are not available, but the indication is that the total catch was better than average. According to the statistics the average catches during the years 1920—1945 were for salmon 16,446 and for brown trout and char 445,411 individual fish. The figures for 1946 were 8,695 salmon and 337,582 brown trout and char. These figures are derived from income tax returns and may be expected to be too low. Attention should also be called to the fact that no fishing for salmon is allowed in the sea.

Norway (K. Dahl).

In 1947 the following number of salmon have been tagged:—

Station Titran: 91 salmon and grilse tagged during the season in the sea, 29 recaptures in the season.
New station Kinn: 152 salmon and grilse tagged in the season, 61 recaptures in the season.
Sandvika river by Oslo: 343 migrating salmon smolts tagged in the season, 8 recaptures in the inner Oslofjord within a few weeks.

Poland (M. Bogucki).

The collection of material for scale analysis was continued. Owing to the unfavourable hydrographic conditions in the autumn of 1947 only 2,600,000 eggs of trout were fertilized.

Scotland (P. R. C. Macfarlane).

I regret to have to report that staffing and other difficulties prevented us from putting into operation any of our research proposals last year. Arrangements for making a start in the current season, however, are well forward, particularly in regard to the Committee's scheme of salmon tagging in the sea.

Spain.

No report.

Sweden (N. Rosén).

The following tagging experiments were carried out:

(a) Salmon used for artificial propagation in the Baltic rivers Mörrum, Dal, Indal and Lule were tagged and liberated in the same rivers.

(b) A number of salmon ascending the rivers Ångerman and Lule were tagged and liberated in the same rivers.

(c) 25 salmon and 11 sea trout caught in the sea off the west coast of Sweden were tagged and liberated. 2 salmon which were liberated in the sea at 14 and 8 km. from the mouth of the river Ätran were recaptured in that river. 3 specimens were recaptured at the coast, one at the same place where it was liberated and the other two at about 7 and 45 km. from the place of tagging.

(d) 64 salmon and 167 sea trout caught in the Ätran during the autumn were tagged and liberated there.

(e) In the river Lagan 10 salmon used for artificial propagation were tagged and liberated.

In 1947 5 salmon and 25 sea trout were recaptured of those which had been tagged and liberated in the Ätran in 1945 and 1946. One salmon was caught at Skagen in Denmark and 19 sea trout were caught on the Swedish west coast, two were recaptured at 100 and 160 km. from the mouth of the Ätran.